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THE IRON AGE

A Review of the Hardware, Iron and Metal Trades.

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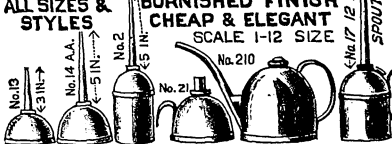
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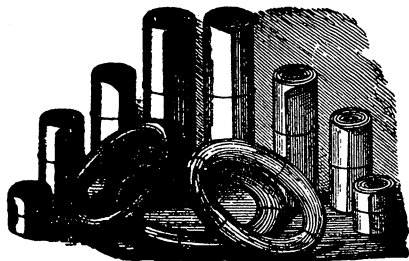
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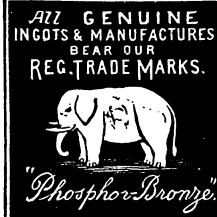
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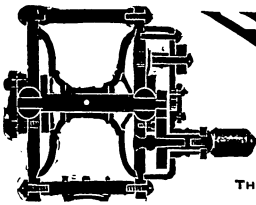
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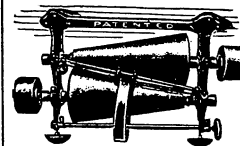
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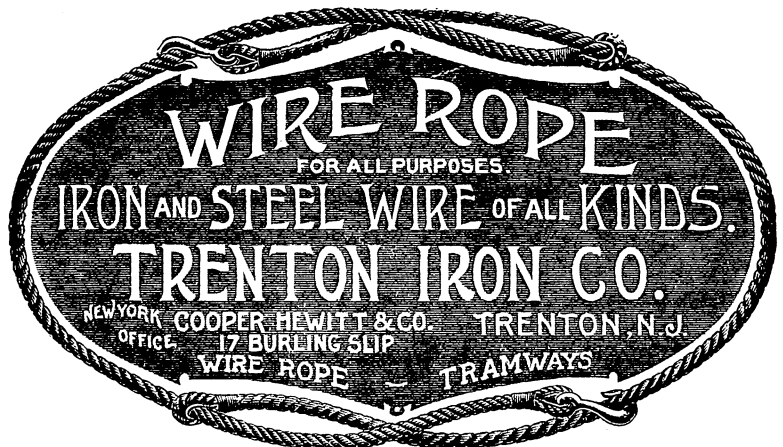
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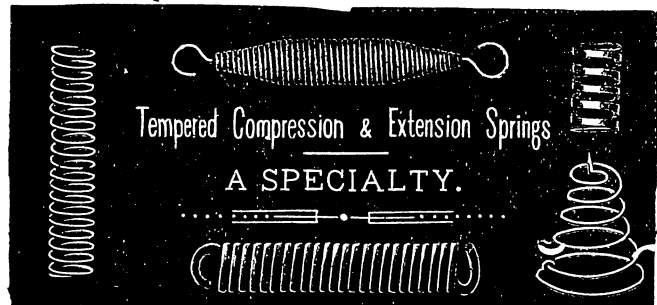
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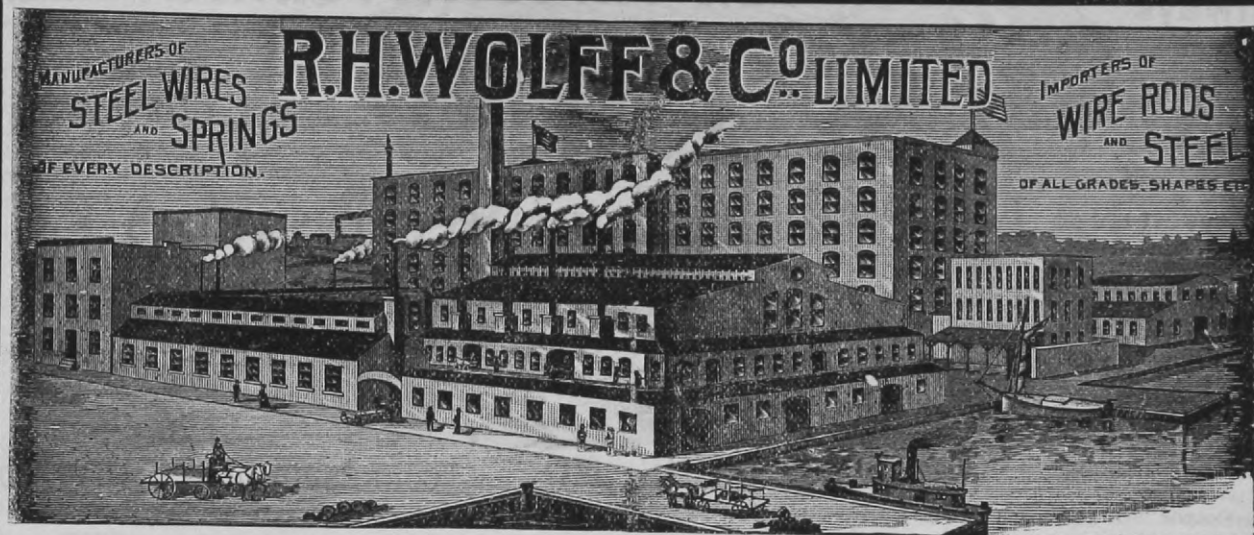
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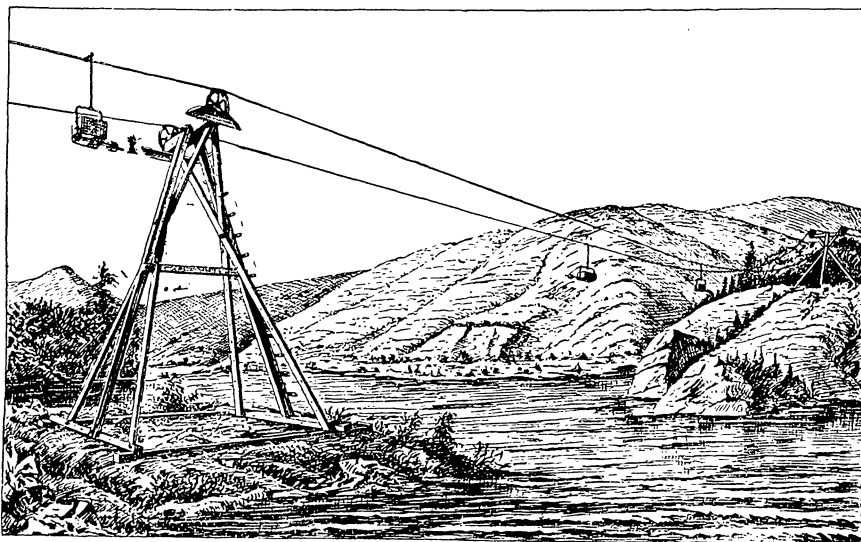
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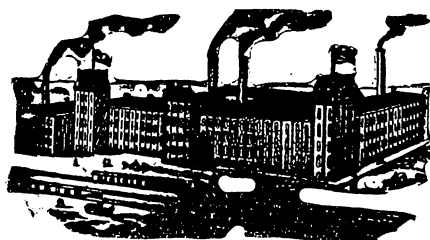
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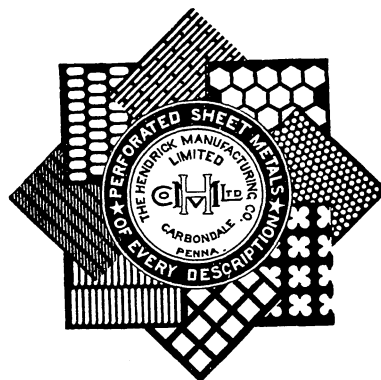
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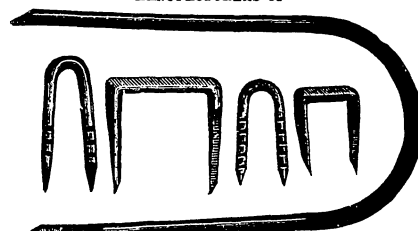
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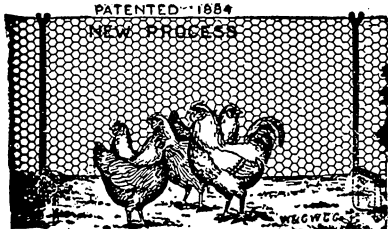
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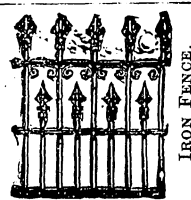


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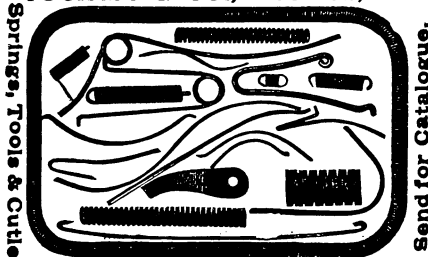
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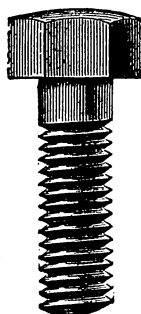
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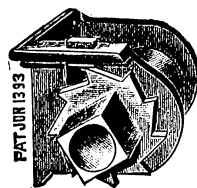
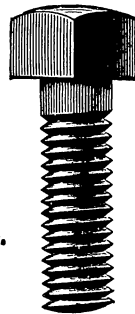
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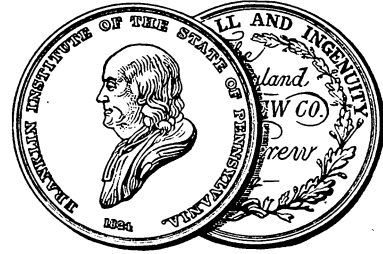
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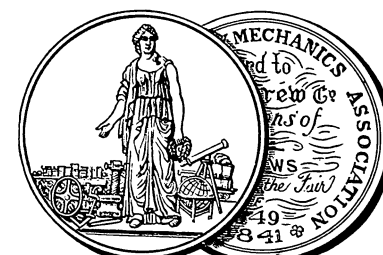
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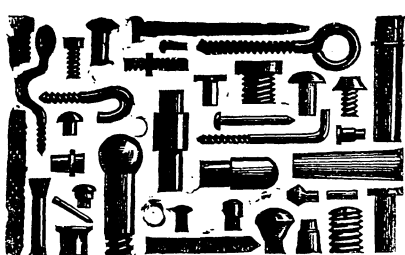
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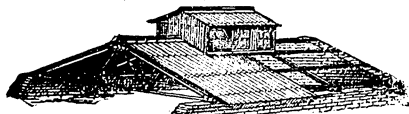
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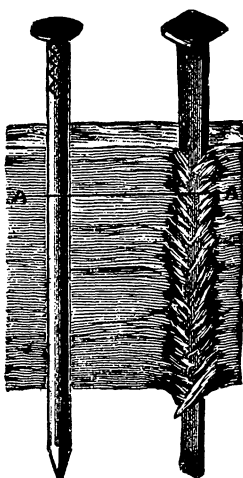
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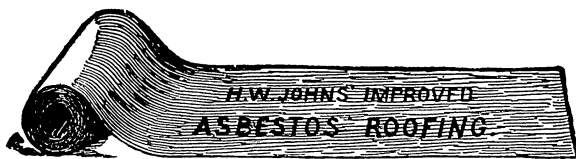
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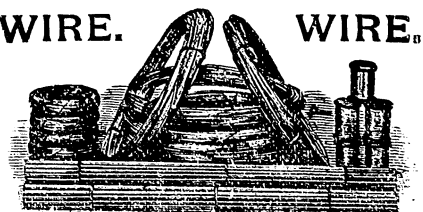
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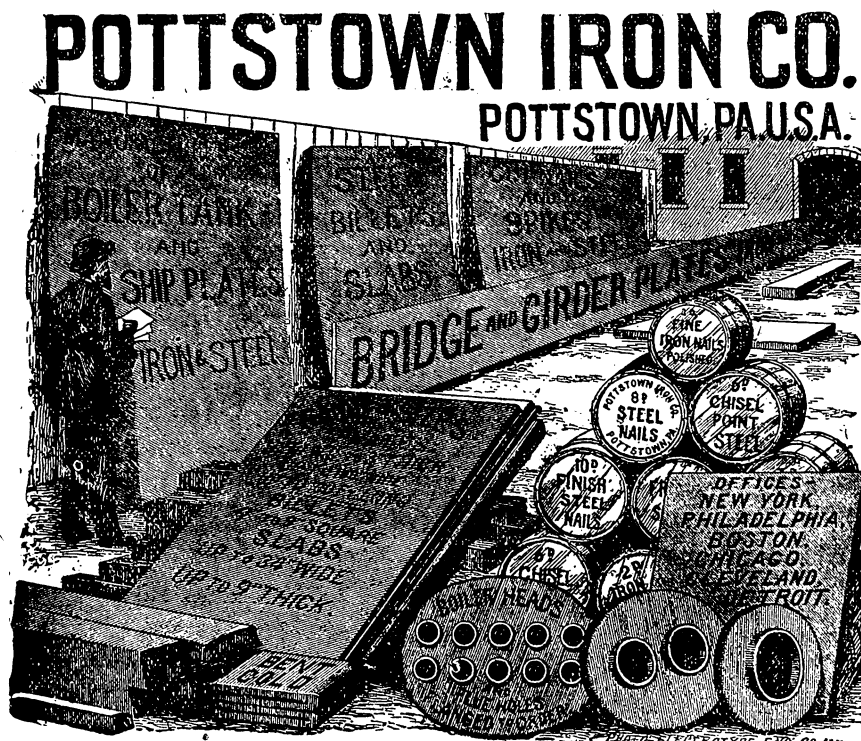
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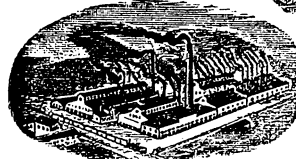
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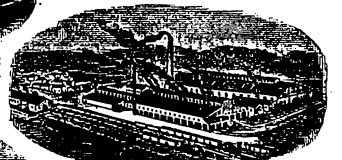
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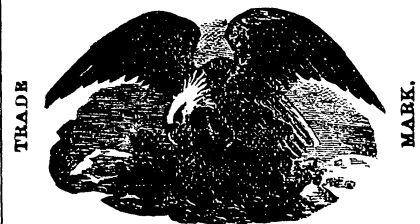
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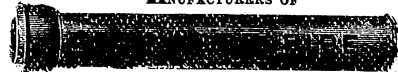
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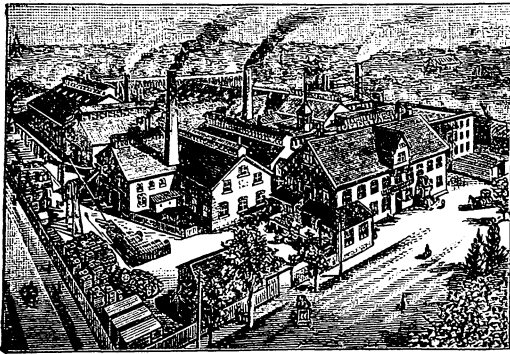
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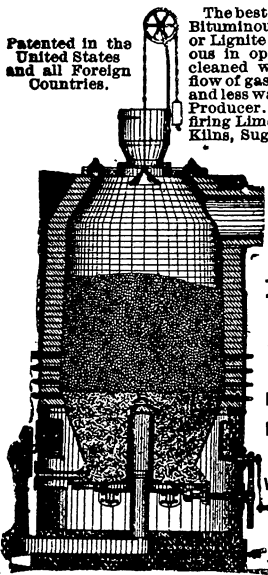
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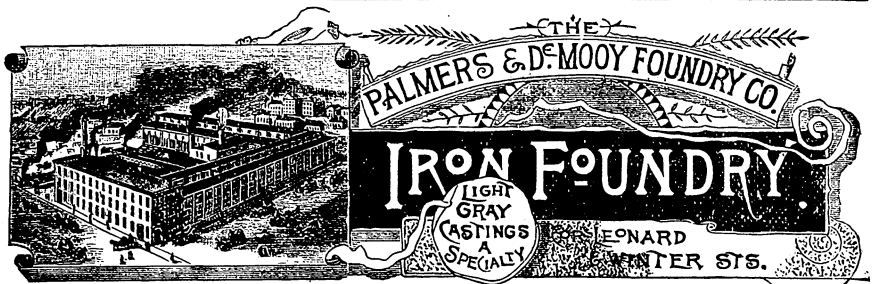
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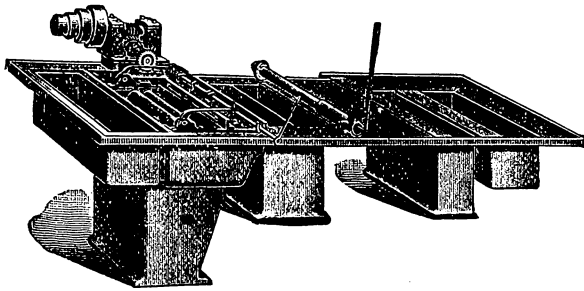
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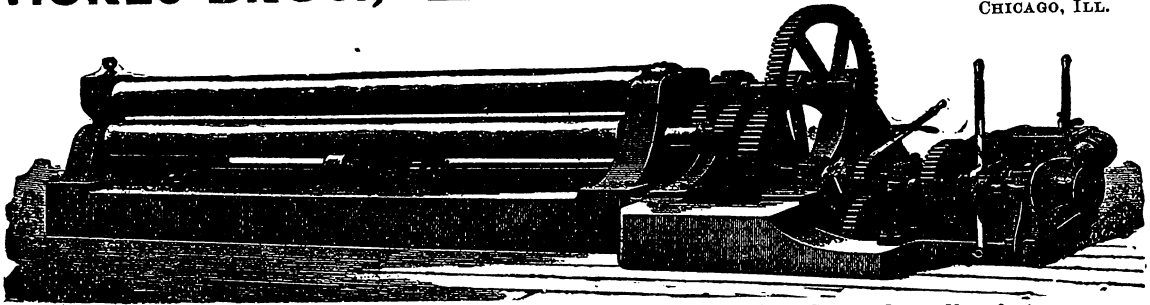
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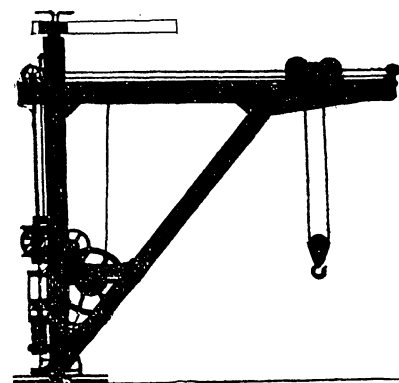
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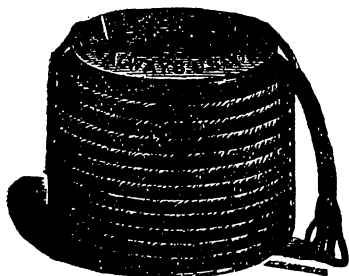


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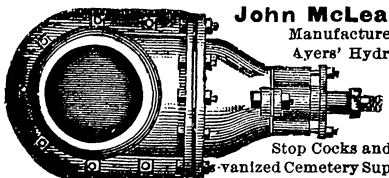
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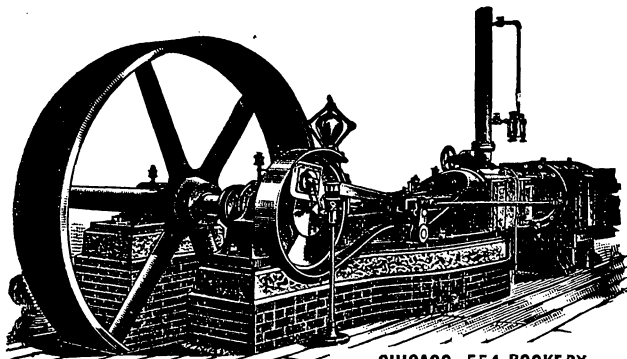
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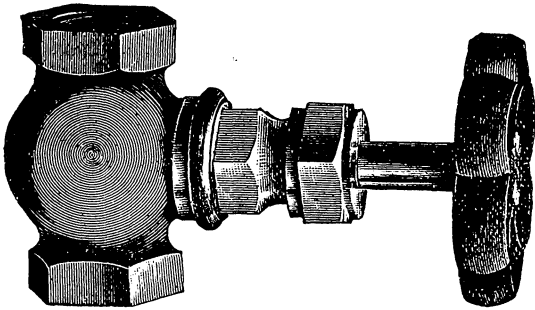
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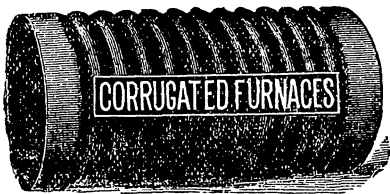
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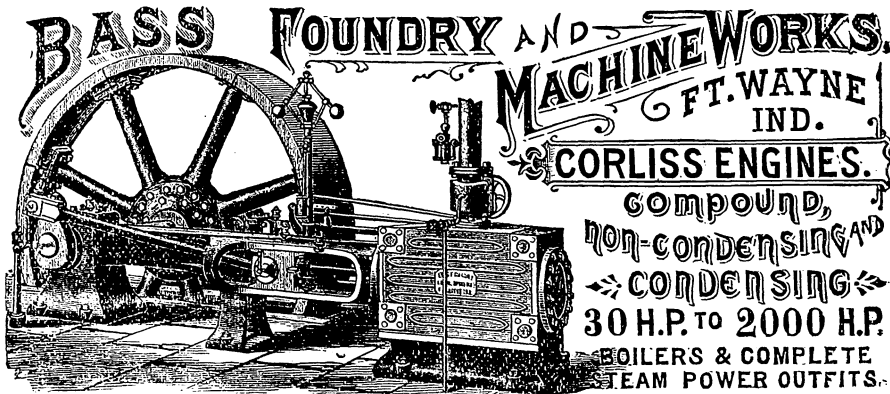
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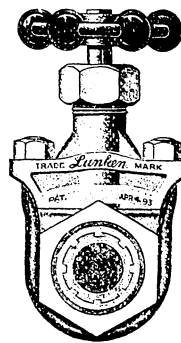
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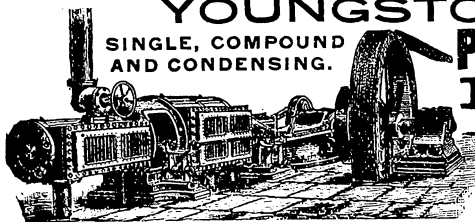
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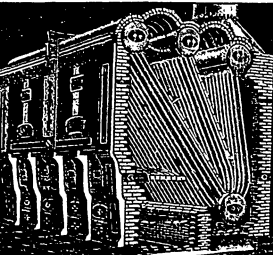
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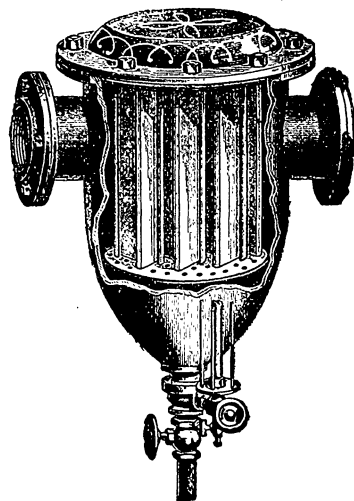
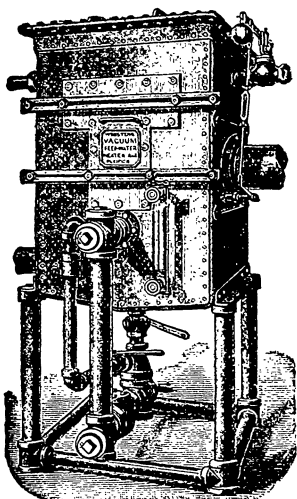
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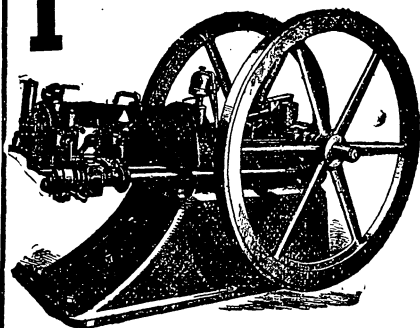
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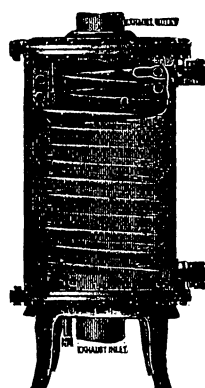
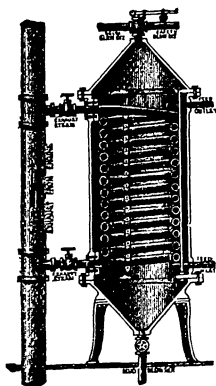
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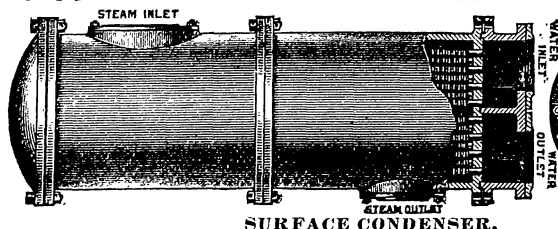
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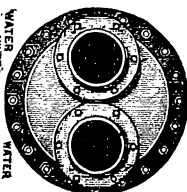
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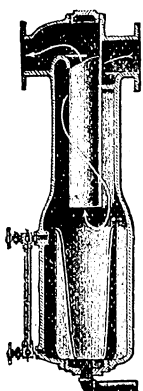
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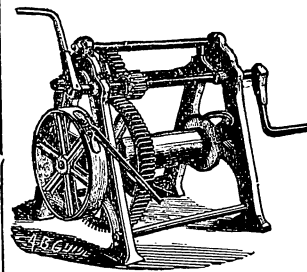
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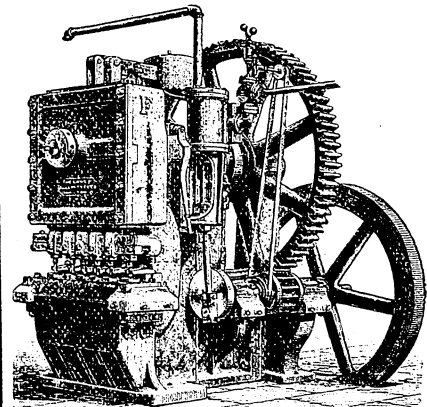
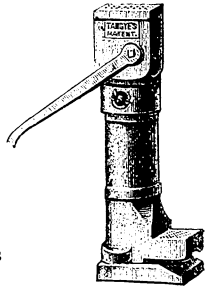


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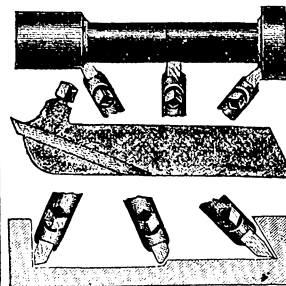


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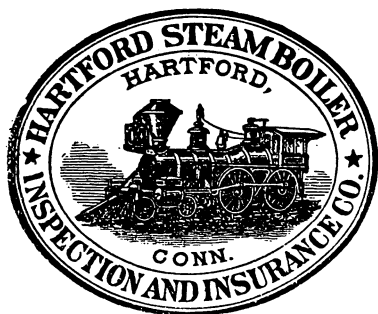
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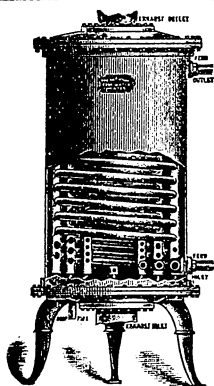
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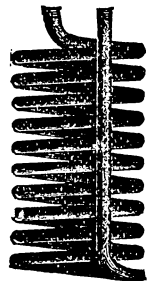


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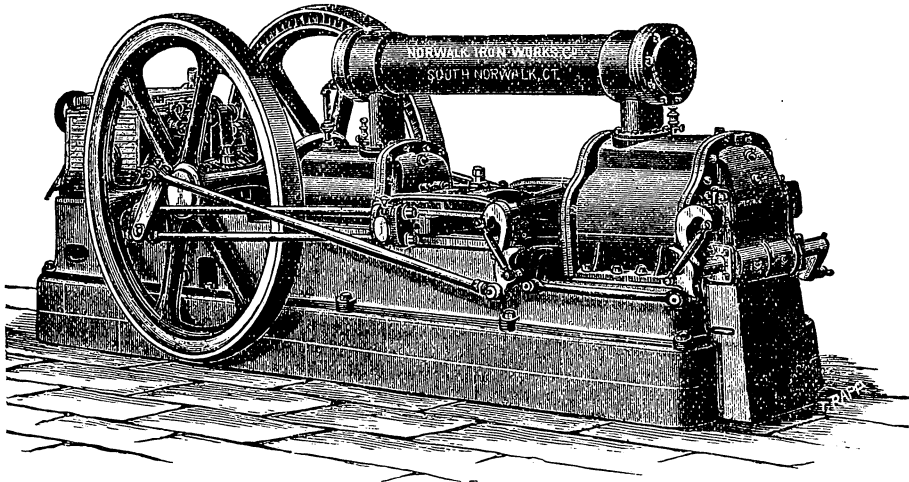
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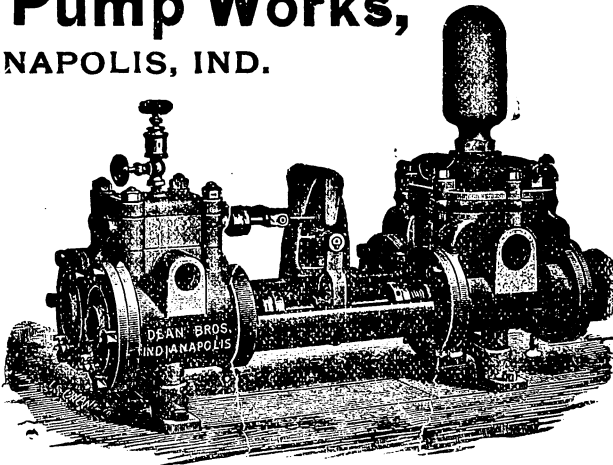
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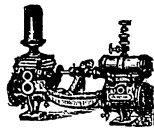
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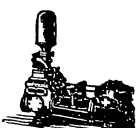
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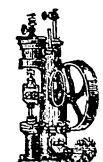
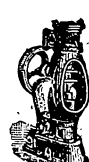
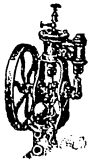


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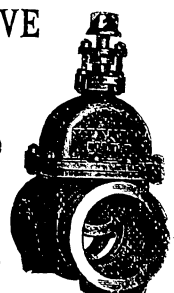
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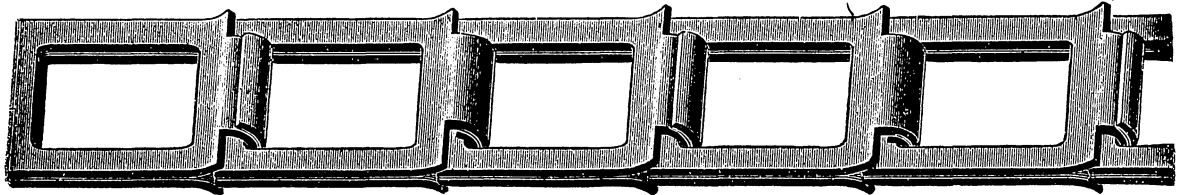
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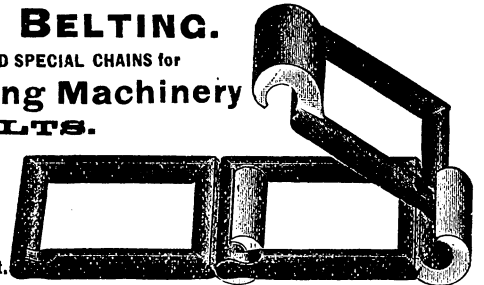
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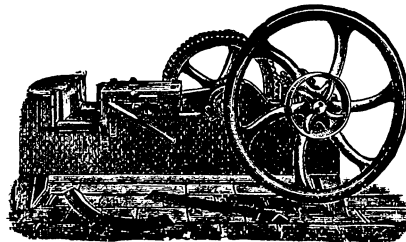
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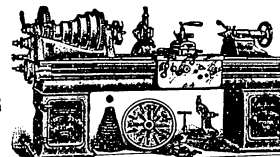


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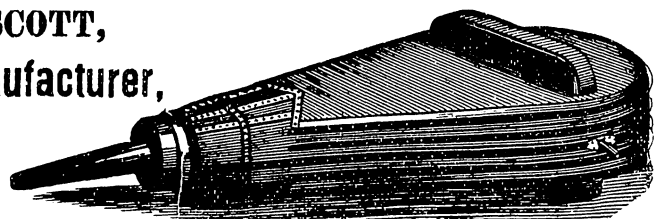
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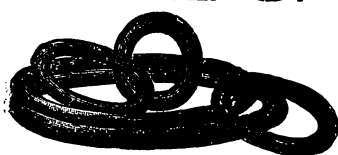
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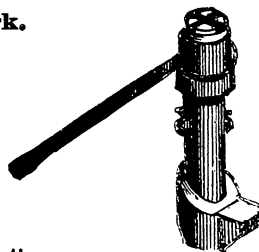
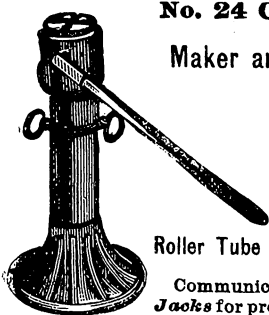
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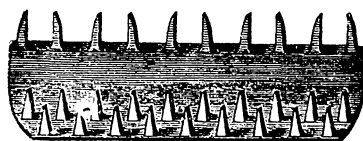
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PHILADELPHIA.

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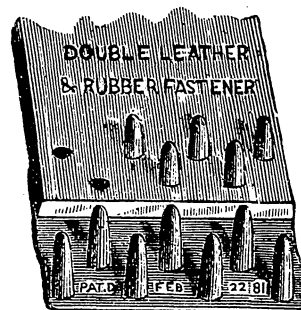
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MANUFACTURER OF

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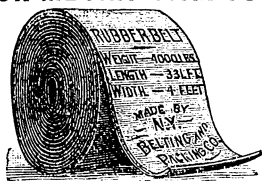
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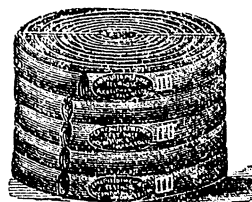
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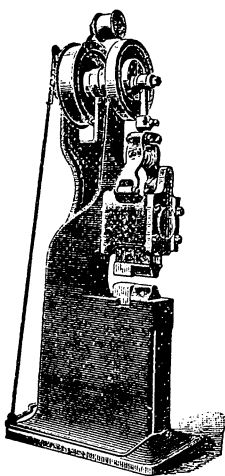
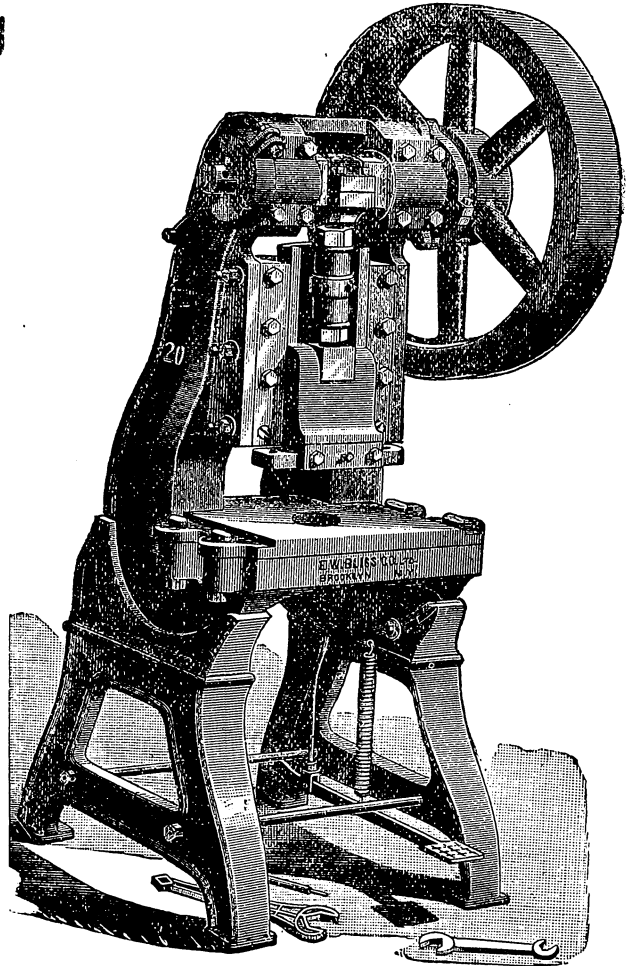
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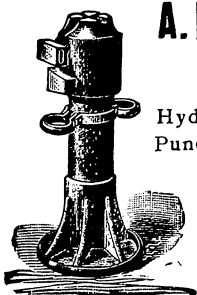
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Simplicity of Construction,
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Economy of Space,
Durability,

And costs less than any hammer built. Send for our new descriptive circular to

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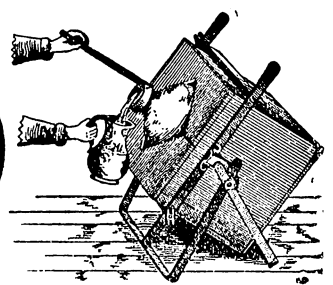
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CAT. No. 3

LINK-BELT

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PHILA
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NEW YORK

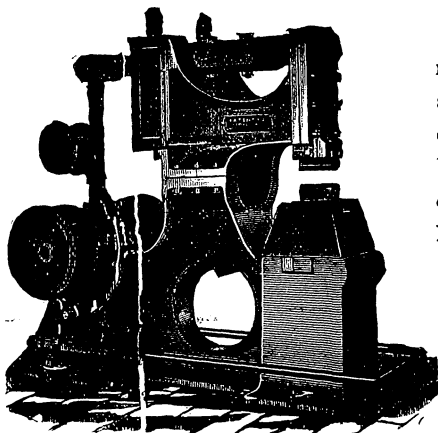
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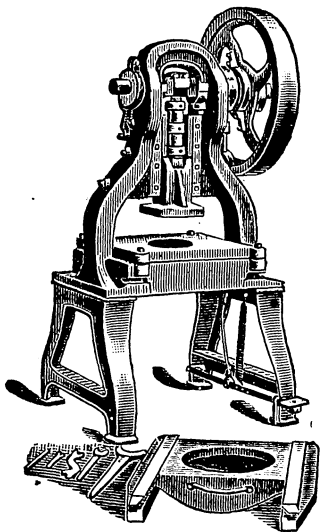
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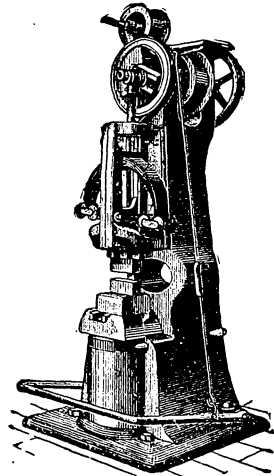
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If You Use Power Hammers

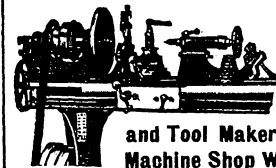
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Chicago Office, 65 South Canal Street.

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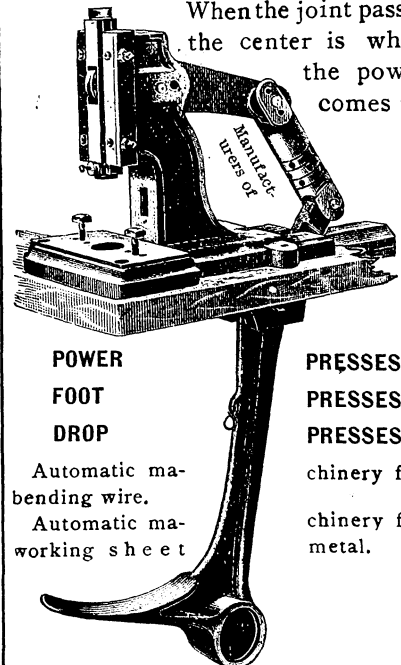
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ENGLISH AGENTS, CHAS. CHURCHILL & CO.,
21 Cross St., Finsbury, E. C., London.

Cross & Speirs Machine Co.,

When the joint passes the center is when the power comes in.



POWER
FOOT
DROP

Automatic ma-
bending wire.
Automatic ma-
working sheet

PRESSES.
PRESSES.
PRESSES.

chinery for
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metal.

31 TO 37 CANAL STREET,
WATERBURY, CONN.

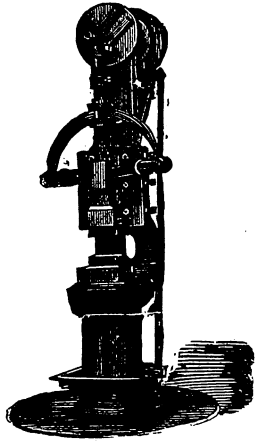
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DEAD-STROKE POWER HAMMERS.

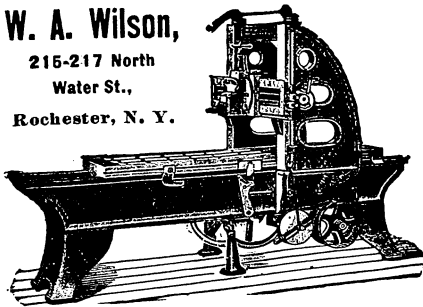
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5 to 250 Pounds.



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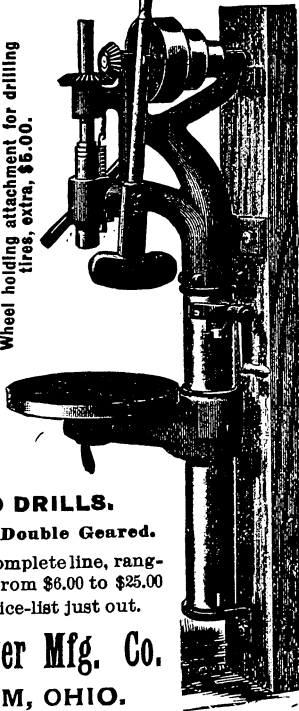


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FIG. 727.

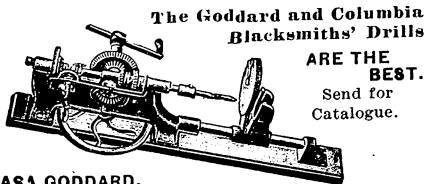
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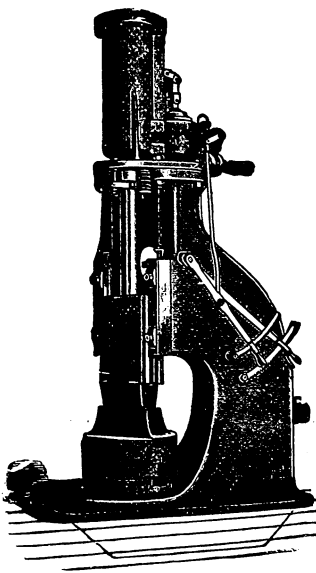
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Send for
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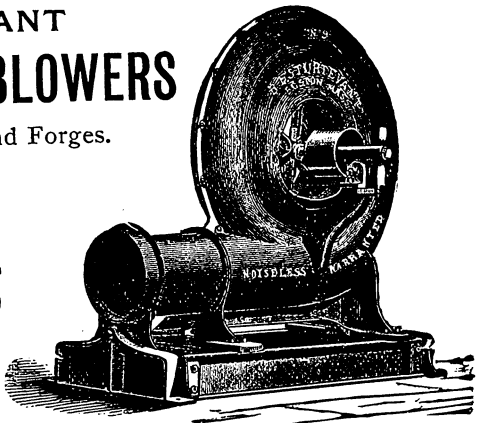
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PLACE ON THEIR

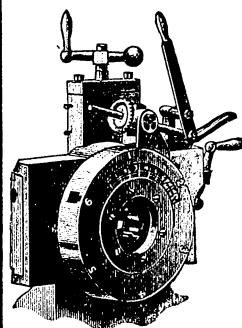
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Pipe Threading & Cutting Machines.

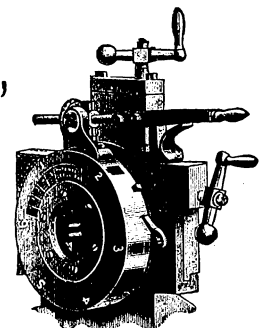
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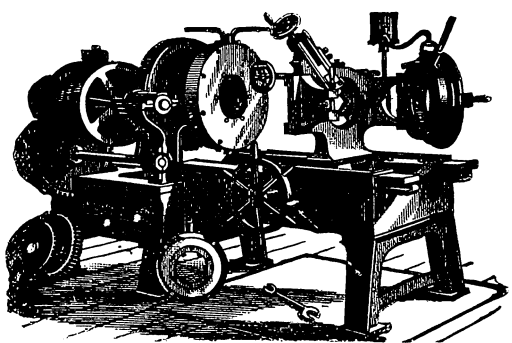
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"Peerless" Head showing dies expanded.



"Peerless" Head showing dies closed.



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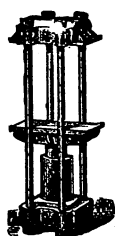
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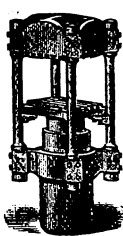
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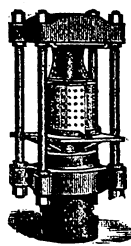
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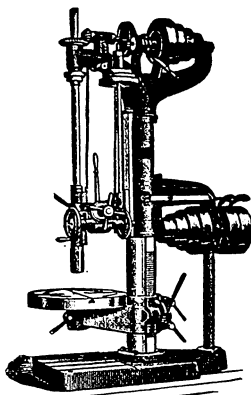
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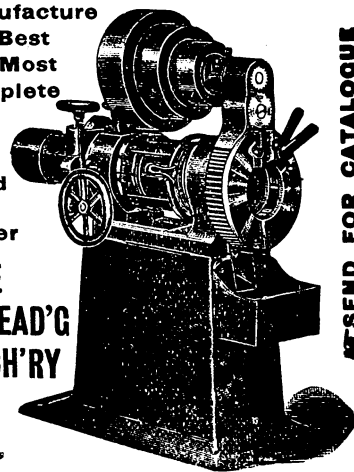
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The Merrill Manufacturing Co., TOLEDO, O.

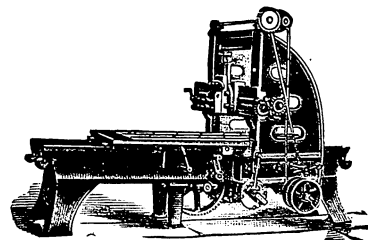
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and Most
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Line
of

Hand
and
Power

PIPE
THREAD'G
MACH'RY
IN
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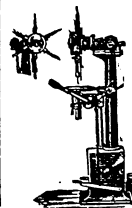
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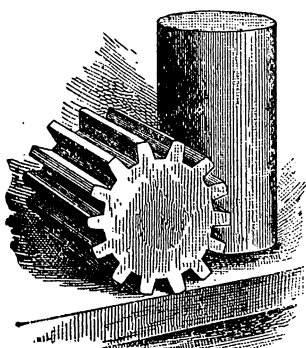
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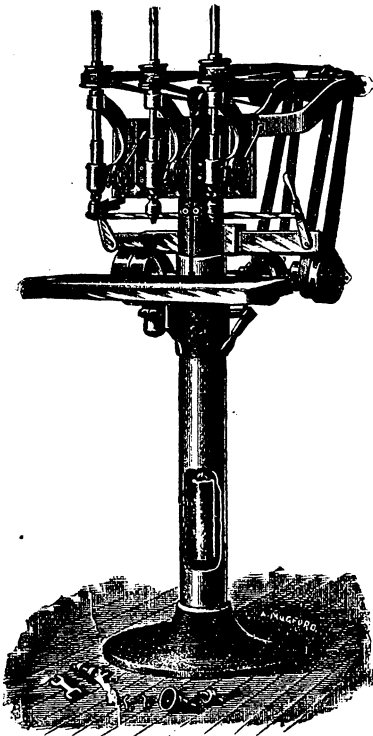
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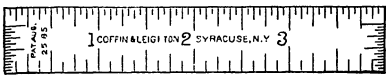
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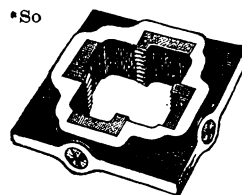
A Pipe-Threading Die extremely easy of operation by reason of the proper clearance of its cutters;

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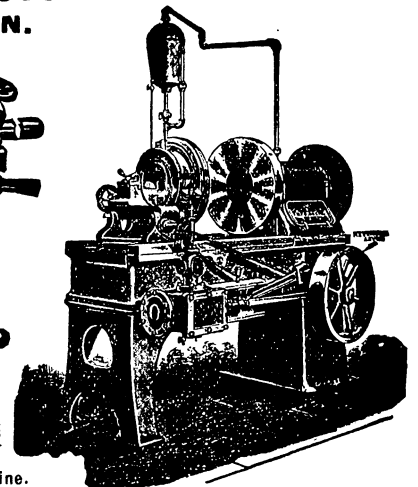
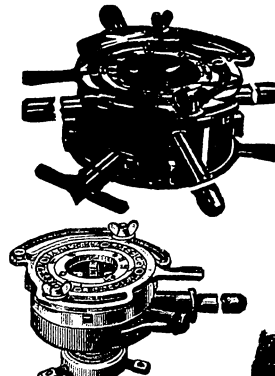
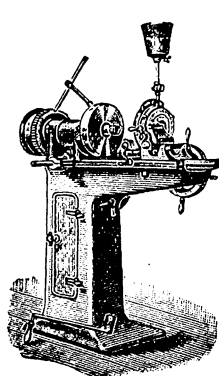
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PHILADELPHIA, U. S. A.

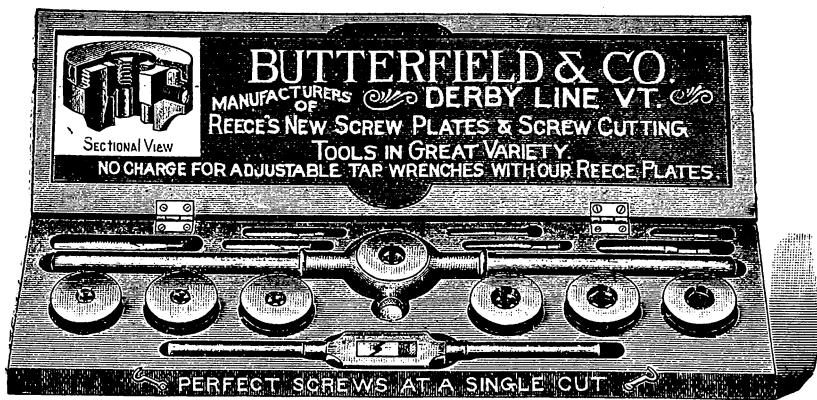
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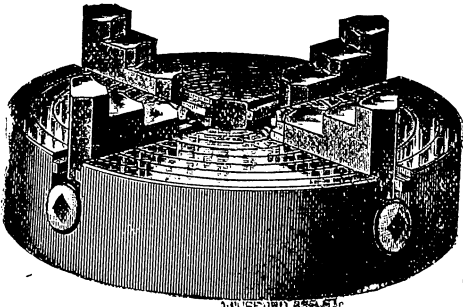
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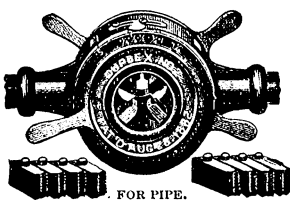
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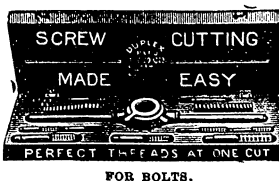
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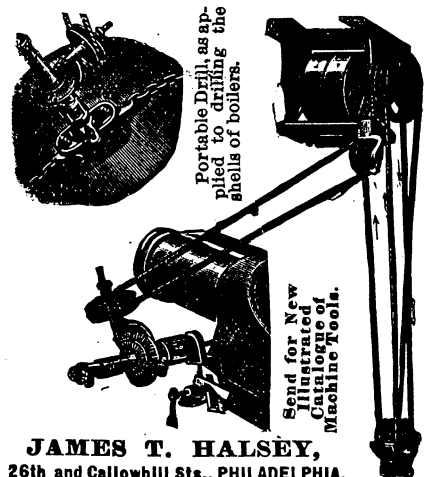
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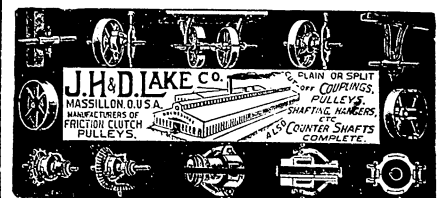
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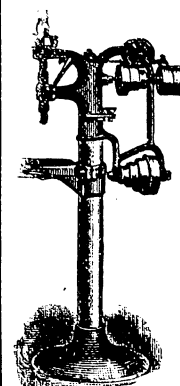
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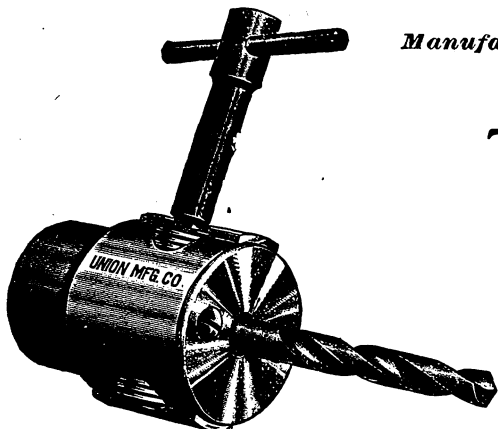
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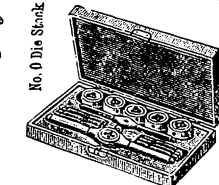
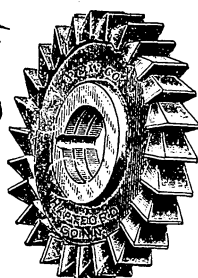
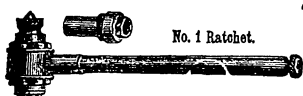
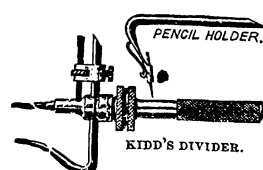


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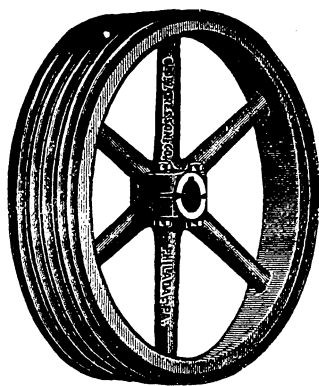
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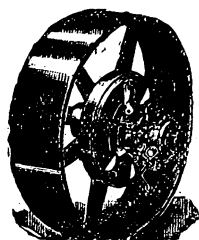
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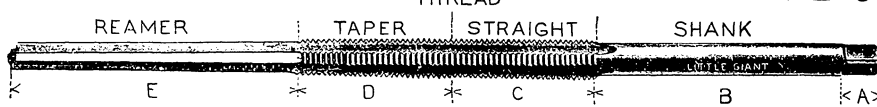
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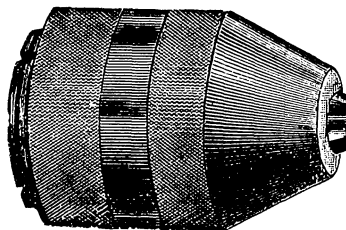
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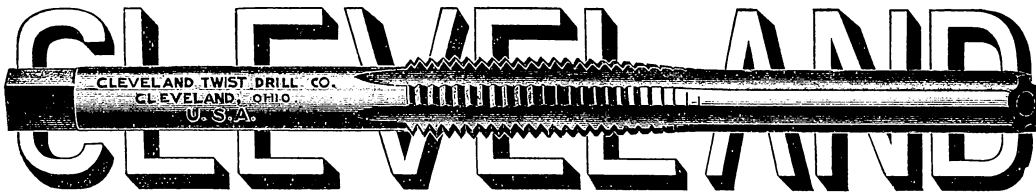
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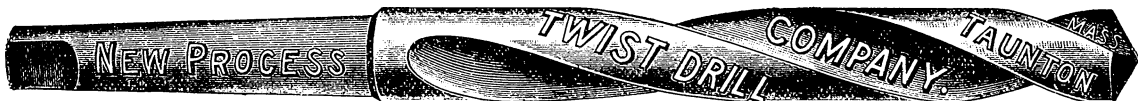
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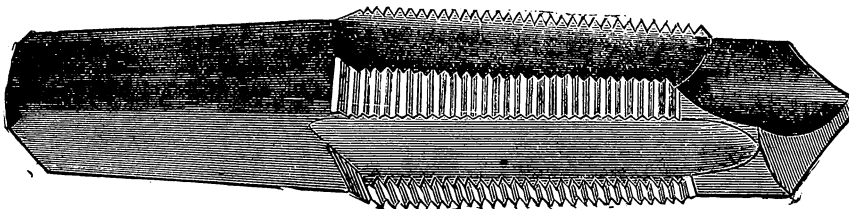
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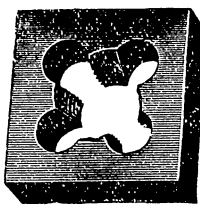
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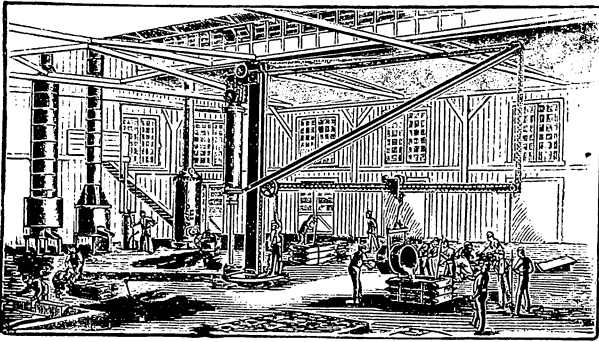
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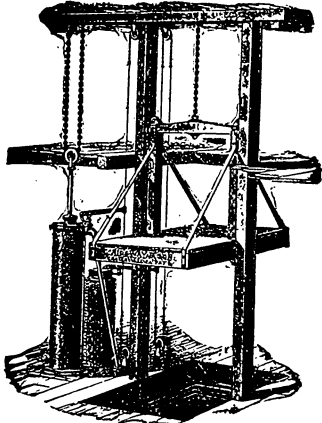
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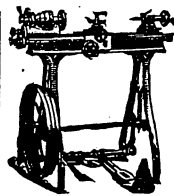


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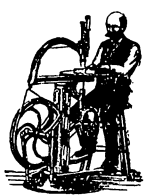
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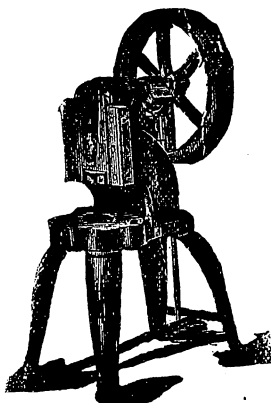
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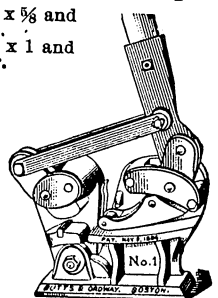
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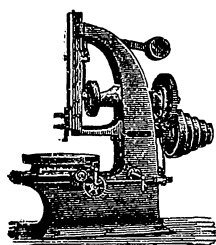
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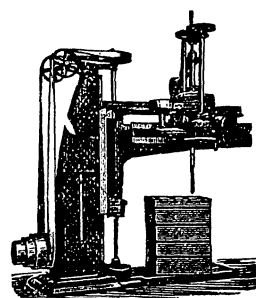


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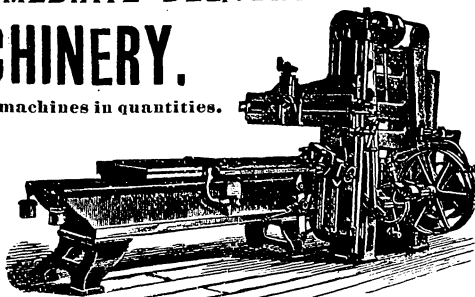
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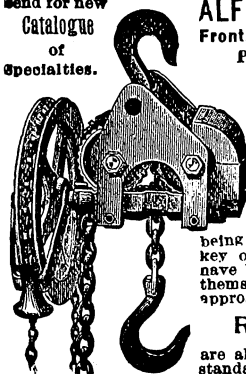
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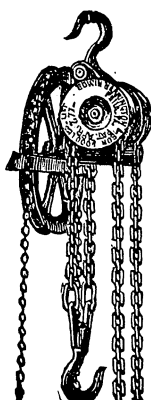
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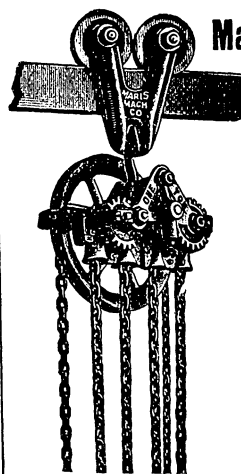
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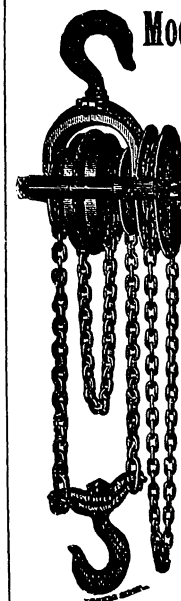
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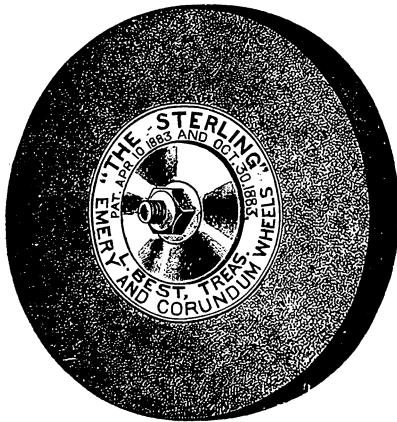
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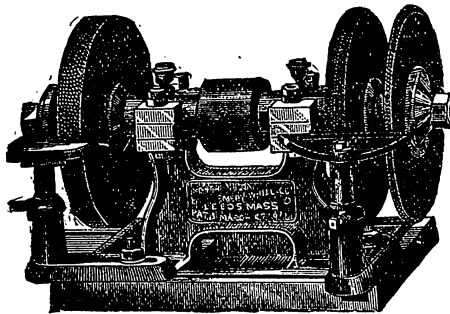
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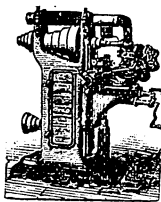
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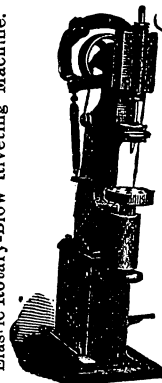
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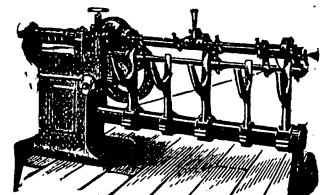
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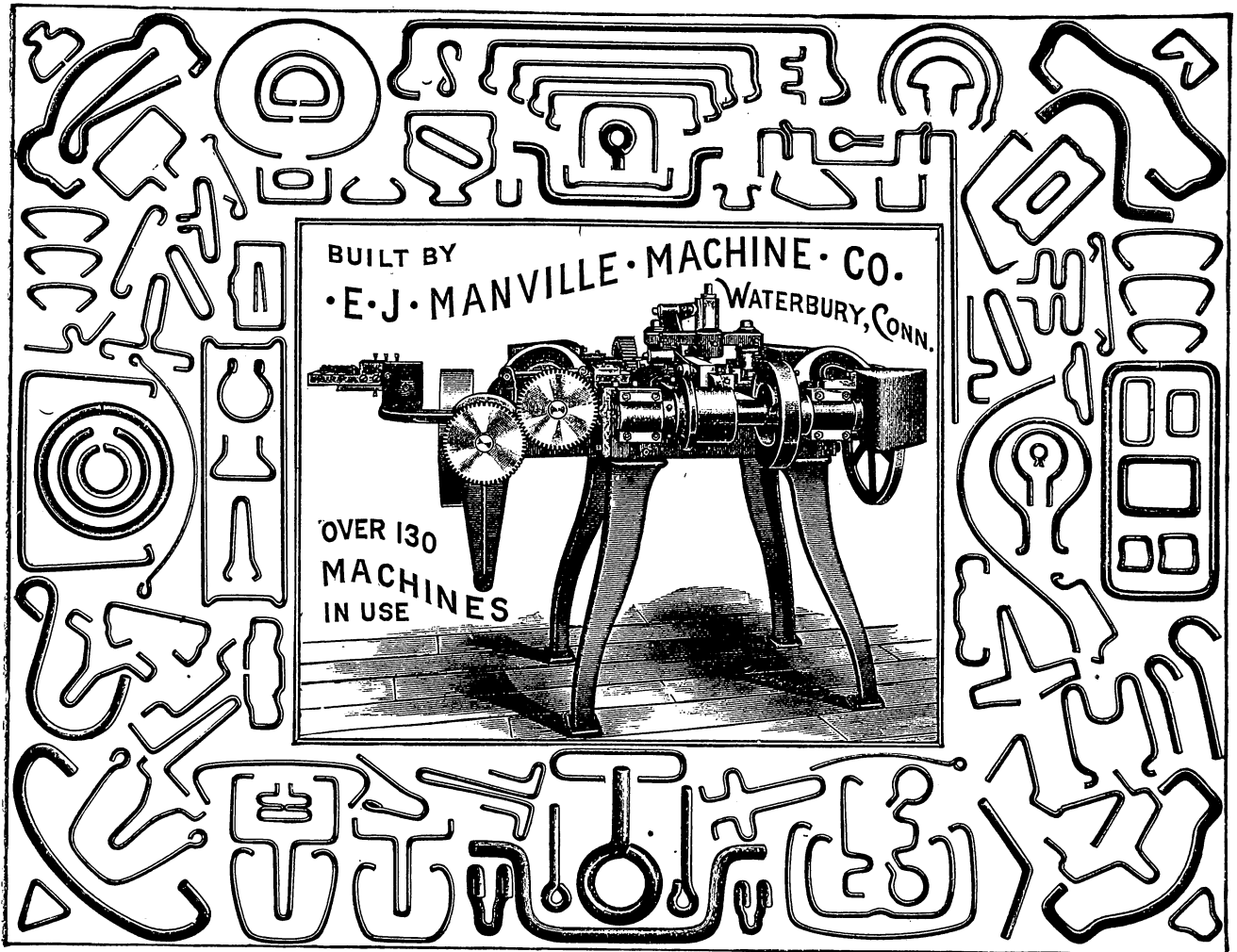
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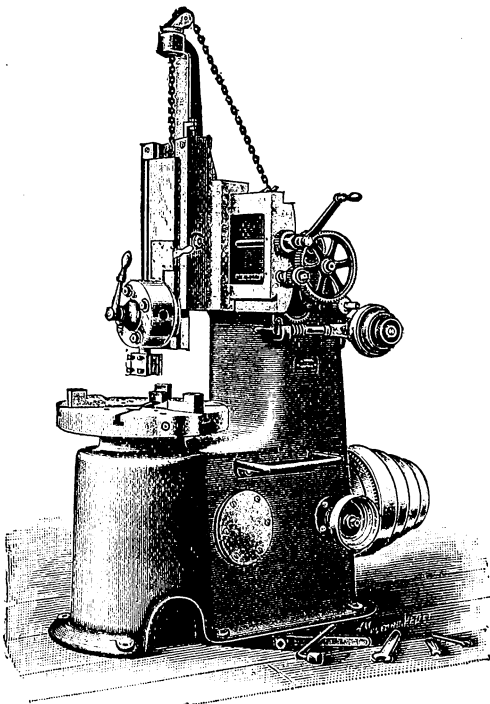


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BOILER ROLLS, PUNCHES, RIVETERS.

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Special lot of NEW ENGINE LATHES,

13 in. x 5 ft.	17 in. x any length bed.
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27 in. x 12 ft.	30 in. x any length bed.
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Responsible parties to manufacture and sell on royalty, a cheap portable steel or iron **CULVERT BRIDGE**; it is adapted to all small streams, runs, etc., in roads, streets, **RAILROADS**, etc.; improved roads is the order of the day; use this bridge, put it below the level of the road, cover it over and thus prevent jarring and wear and tear of vehicles, etc. Apply to

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70 Horse High Speed Automatic Engine, new; suitable for electrical work or power purposes.
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One 14 x 24 Trenton Automatic Cut-off Engine, nearly new, 125 H.-P.

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One Engine Lathe, 18 in. x 8 ft. Fitchburg Mch. Co.
One No. 3 Power Punching Press. Stiles & Parker.
One 40 in. Shumacher Drill Press. B. G. & P. F.
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One 36 in. Harrington Drill Press. B. G. & P. F.
One large Hilles & Jones Power Geared Shear, 15 in. Blade, weight about 10,000 lbs.
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One 36 in. Hilles & Jones Radial Drill Press.
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14 in. x 6 ft. Fitchburg Engine Lathe.
14 in. x 8 ft. " " " "
21 in. x 14 ft. " " " "
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8 in. Niles Semi-Universal Radial Drill.
9 in. Niles Slotting Machine.
60 in. Niles Pulley Borer.
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4 ft. 3/4 in. Betts Mch. Co. Hand Boiler Rolls.
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8 ft. Morgan, Williams and Co. Power Boiler Rolls.
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20 in. throat Betts Machine Co. Double End Punch and Shear.
25 in. x 25 in. x 5 1/2 ft. Hubener Screw Planer.
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All in good order.

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Portable, Tubular and Vertical Boilers of all sizes.
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93 in. Hydraulic Riveter, Jones & Lamson.
Travelling Crane, 100 in. 8 wing Engine
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one setting up to 1 inch 51 in. Swing Engine Lathe, 18 ft. Bed.
No. 27 Shear, 30 1/2 in. 32 in. Swing Engine Lathe, 16 ft. Bed.
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72 in. x 60 in. x 24 ft. 4 Riveter for Bridge work.
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Switch Planer, 2 Heads, Blake Duplex Compound
Good as new. Pumps, &c.

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32-INCH UPRIGHT DRILL PRESS.

TWO OF THEM; SECOND HAND.

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Height, 8 ft. 2 in.
Greatest Distance Spindle to Base Plate, 52 in.
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Weight complete, 2600 lbs.
Back Geared and Power Feed, Quick Return, Balanced Spindle; Shafts and Studs made of Steel.

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1 Dietz Gang 22 x 8 Engine Lathe, 2d hand.
1 New Haven 28 x 8 " " " "
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A full line of the most improved Turret Lathes, and Pulley Machinery, also Motor Gear Cylinder Boring and Triple Facing Machines.

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24 x 48 Miller & Allen Corliss Engine.
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16 x 24 " " " New.
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One Fifield Screw Cutting Engine Lathe, 30 in. swing on 16 ft. bed, with blocks to raise same to swing 47 in.

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1 20 in. x 10 ft. Putnam.
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1 16 in. Lathe & Morse Crank.
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1 40 in. x 40 in. x 9 ft. Pond M. T. Co.

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Also, large variety of other machines. Write for complete list and detailed description.

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One 25 H.-P. Otto Gas Engine in first-class condition. Can be bought very reasonable.
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1 Newbold Rotary Shear, cuts $\frac{1}{2}$ in. thick.
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1 Nail Plate Shear.
5 Wire Nail Machines, 4 sizes.
Send for details and prices.

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Knowles Independent Condenser for 350 H.-P. Barr
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Davidson Pumps, 24 x 12 x 24.
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Compound Duplex, 14 and 20 x 5 x 5.
" 10 " 16 x 10 x 10.
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60 Ton Flywheel, 28 ft. dia.
Scow, 70 ft. x 23 ft. x 5 ft. hold.
Hydraulic Elevator. Whittier. Cylinder 16 in. x 6 ft.
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All in first-class order and cheap.

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1700 tons Johnson Girder Rails, 38, 48, 62 and 66 lb. Rails.
All selected and in excellent condition for relaying and only slightly worn.
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1 Hendey Shaper, 15 in. stroke, imp. vise.
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Also variety of Engines, Boiler Pumps, &c.
And other machinery, new and second hand. Write for prices. **Machinery Supply Company,**
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Corliss.	High Speed Auto.	Horizontal Slide Valve.	Vertical Slide Valve.
10 x 20	11 x 20	9 x 24	20 x 24
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16 x 42	13 x 12	10 x 24	10 x 12
23 x 36	Horizontal Slide Valve.	11 x 20	9 x 10
26 x 48	23 x 36	12 x 18	9 x 9
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A Variety of Machinery, very cheap.
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NEW PLANERS.

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ENGINES, Horizontal and Vertical. All types and sizes up to 2000 H.-P.

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National Bolt Cutter, Double Head.
Engine Lathe, 16 in. or 31 in. swing, Hollow Spindles.

4 Spindle Tapping Machine, Upright.
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10 in. Speed Lathe.

Universal Milling Machine, No. 1 or No. 2.

4 Hangers 12 in. Drop, 2-7-16 in. Shafting.

30 ft. 2-7-16 in. Shafting.

Back Geared Drill Press, 26 in. or 30 in. Table.

60 in. Shell 9 ft. long with head in.

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 130 x 30 x 8 ft. Niles Planer.
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Lathes, 52 in. swing, 41 ft. bed; 30 in. swing, 22 ft. bed. One Pitt Lathe. Drills, 34 in. upright, 5 ft. post drill, Horizontal Drilling Machine. Engines, 5 new and 7 second-hand, from 100 H.P. down. Cranes, 15 ton Gib Crane, 30 ft high; 12 ton Gib, 18 ft. high. Building, extra heavy timbered, 70 ft. span, 100 ft. long, fit to remove, two stories, iron clad. Hundreds of Iron Pulleys and Fly Wheels, Hangers and Shafting. Address

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 Manufacturers of Clock Trimmings, Rivets, Springs &c.

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Two Lodge & Davis Shapers, 32-inch stroke, first-class condition. In use about two years.

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Machine Tool Co., Cincinnati, O., U. S. A.,

Have for sale a large line of first-class second hand Engine Lathes, Planers, Shapers, Drill Presses, Milling Machines, &c.

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A DOUBLE CUTTING Paper Roll Cutter.

Patent just issued and for sale. Cuts the Paper both ways. Adjustable to any width Paper. Requires no rod to hang roll in cutter. Made partly of wood and iron or all iron. Copy of Patent sent on application. Address

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A second-hand Horizontal Boring Mill, 60 in. in good condition. Also a second-hand Direct Steam Hammer, about 500 lbs capacity, for blacksmith work in machine shop. Address, with particulars,

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In the town of Little Falls, N. Y. Stock of general Hardware and Mill supplies, invoices about \$7000. Business established nine years. Annual sales \$20,000. Must be sold and will be sold at a bargain. A rare chance for a bright hardwareman. Address

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Hardware Store, will invoice about \$8,000. Cash or Bankable notes only. Splendid business. Established 1880. Good Location. Good reason for selling.

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For settlement of an estate, it is necessary to dispose of a well established and profitable jobbing and retail business in the hardware, plumbing and machinery line, located in Albuquerque, New Mexico. Goods sold all over Central New Mexico and Northern Arizona. Full information and references furnished by mail, and business books open to personal examination. Location the best in the United States for invalids suffering from pulmonary trouble. Address Lock Box No. 556, Albuquerque, N. M.

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—THE—

Very Desirable Second Loft
 No. 99 CHAMBERS STREET,
 CORNER OF CHURCH, 25 X 100 FEET,

TO RENT,

from May 1st. Light and airy. Entrance on Chambers Street, with steam elevator on Church Street.

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FOR SALE.

One Buckeye Girder Frame Automatic Cut-off Engine, Cylinder 14 x 24 inches, 120 H.P. In good order, having been but little used. P. O. BOX, No. 182, Baltimore, Md.

Reduce Expenses.**Increase Sales.**

A good opportunity is offered to a concern manufacturing a line of goods pertaining to the Hardware trade to the value of \$50,000 to \$75,000 per year. Such a concern may be under heavy rent and expenses for power &c., more than they can afford to pay these times. To such we offer (all other things being satisfactory to both parties) room and power and consolidation of interests. We have a large new plant with first-class water power, situated in a beautiful borough in the State of Connecticut about 100 miles from New York on two lines of railroads, one of which runs through the property. Plant adjoins the freight depot of one of the principal lines of railroad. Facilities for loading or unloading cars at six different points on the plant. Borough has all the modern improvements such as Water, Electric Lights, Gas, &c., &c Room and power to employ 125 hands more than we now have. Owners (no agents) address, with full particulars and reference,

"PRESIDENT," P. O. Box 1042,
 New York City.

BARGAINS, SECOND-HAND.

The following tools have been carefully overhauled and placed in perfect order, and are bargains.

12 in. x 5 1/4 and 14 x 6 Engine Lathe.
 13 in. x 7 and 15 x 7 Engine Lathes. P. C. and Rod Feeds.
 18 x 6 Porter Lathe, Compound Rest.
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 24 in. B. G. Drill Press.
 24 x 24 x 8 Planer.
 New 10 in., 13 in., 15 in. and 22 in. Eng. Lathes. Planers, Shapers, Drill Presses, &c.
 SEBASTIAN LATHE CO.,
 113-115 Culvert St., Cincinnati, Ohio.

For Sale At a Bargain.

A Porter Hamilton Slide Valve Steam Engine, 30 x 36, with wheel 12 ft. x 50 in. Rubber Belt, 11 ply, 110 ft. long 48 in. wide. Engine good as new. Built by William Tod & Co., Youngstown, O. Can be seen near Pittsburgh, Pa. For further particulars apply to

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I WANT TO SELL

my Hardware store in Johnstown, Pa. Stock invoices about \$5000. Address
 JOHN WAELDIN,
 Room 611 Union Trust Building, St. Louis, Mo.

CONTRACTS WANTED.

For light and medium castings and for blacksmithing and wood work, etc. We have the complete facilities of a very large agricultural implement manufactory and foundry. Address, with specifications,

"EXTRA CAPACITY,"
 Care of Braostreet's, Louisville, Ky.

A RARE CHANCE

to secure an established Machine Tool business in New England, with a good supply of orders, is offered by the advertiser, who must give preference to other interests. Tools, stock, etc., will be sold at a bargain.

Address

"E."

office of *The Iron Age*, 146 Franklin Street, Boston, Mass.

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A Hardware stock for sale. The owner and proprietor, after 28 years' successful business, jobbing and retail, desires to dispose of stock and good will. Annual sales \$120,000 to \$150,000; three traveling men employed; stock carried \$30,000 to \$50,000, but could be reduced \$10,000 or \$15,000. Situated in the heart of an agricultural belt, a healthy city of 20,000 people, a railroad centre, latitude same as St. Louis and climate all that could be desired. Parties interested, address

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office of *The Iron Age*, 96-102 Reade St., New York.**FOR SALE.**

Stock and fixtures of an old Hardware and Tool store, in New York City, established over 75 years. Has customers on both continents. Merchandise and fixtures are clean and new. This is an opportunity for persons wanting an opening to make money. Incorporated. Only reason for selling is to close an estate. Address, appointing interview, "OLD BUSINESS," office of *The Iron Age*, 96-102 Reade St., N. Y.

A FINE CHANCE

to invest in a splendid Hardware business in the finest little city in the West. Stock clean and neat, consists of Hardware, Stoves, Crockery and a general line of House furnishing goods. A change upward in prices will soon take place, therefore, now is "the time to invest." Address "FINE CHANCE," office of *The Iron Age*, 96-102 Reade St., N. Y.

RECEIVER'S SALE. STRUCTURAL IRON WORKS. BIDS INVITED.

The entire Plant, fully equipped and ready for immediate operation, of the Riverside Bridge & Iron Works, situated at Paterson, N. J. (16 miles from New York City), and admirably located on the main line of the N. Y., L. E. & W. R. R., with switch connection. Area nearly 30 city lots. Plenty of skilled labor, strikes never have occurred. Facilities for handling the heaviest as well as light work. Will be sold at a great sacrifice and on easy terms. **A RARE OPPORTUNITY** to embark in a business with little capital that promises great results, considering the low price of iron and cheapness of capital. Address for full particulars

J. ALBERT VAN WINKLE, Receiver,
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N. B.—Remnant of stock of material, consisting of shapes, bars, rivets, bolts, &c., is offered for sale. Stock list can be had on application to receiver.

PITTSBURGH SALES AGENCY,

J. H. HILLMAN, Manager,
No. 8 Wood St.,
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IS NOW ENGAGED IN THE

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A FINE

Business Opportunity

for a live business man or two partners who have \$25,000 to invest in a first-class, old, well established and well located

JOBGING and RETAIL HARDWARE

business, which did not lose money last year.

STOCK IS WELL ASSORTED.

Good location in large Eastern City. Reasonable lease of premises can be continued. This will bear full investigation. Parties who can command above amount of capital address

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ATTENTION, Hardware Dealers.

I send free a sample of my Self Selling Wagon Jacks to parties whom I believe write me with a view to handling them. Address

S. S. JOY,
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Take Notice.

E. Bissell, Son & Co.,

AUCTIONEERS.

Thursday and Friday, March 29th & 30th,
at 10 O'Clock each Day.

Large Special and Peremptory
Trade Sale of
CUTLERY and KINDRED GOODS,

Comprising in part

Several Thousand Dozen

Of Table Knives and Forks and
Knives only.

First Quality Discarded Numbers and Seconds, Desirable Patterns, direct from the Manufacturers and Importers.

This sale will also include a large assortment of

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All buyers of Cutlery should make an effort to attend this sale, as it will be worthy their attention. Goods will be sold in quantities to suit the Jobbing and Retail Trade without reserve. Catalogues will be sent to parties who desire them soon as ready.

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No. 185 Pearl St., Brooklyn. 4 story and basement, brick, 25 x 85. Apply to
GEO. E. LAURETT & CO.,
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Corliss Engine, 100 H.-P. Must be in good order and cheap.
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FOR RENT.

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N. C. STILES.

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A man of energy and business qualifications, who has been in the hotel business for twenty years, intends establishing, in a live and growing city of over 100,000 inhabitants, an agency for several lines of trade which will not conflict. To this end he solicits correspondence from Manufacturers, Importers and Jobbers. Satisfactory references and if business requires bond will be given. Please address

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P. O. Box 188, Syracuse, N. Y.

WANTED.

A BUSINESS OR PARTNERSHIP.

To Machinists, Iron Founders, &c. An experienced Mechanical Engineer wishes a small business or partnership where there is already a connection, but where either extension or retirement of present owner is contemplated. Advertiser has good specialties to introduce. Address, with full particulars,

"E. D.," No. 322,
office of *The Iron Age*, 98-102 Reade St., N. Y.

FOR SALE.—Valuable property for sale—Hardware business in Northampton, Mass., the oldest stand in Hampshire County. The owner is to engage in the manufacture of Horse Blankets and must dispose of this property at once. No one without adequate means need apply. Address L. F. WOODBURY, Northampton, Mass.

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THE JOHN W. EALY COMPANY have just issued the most complete and reliable Reference Book of Credits for the

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This book will be sent for inspection (free of express charges) to any Manufacturer or Jobber, upon application to either of our offices.

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Undisplayed Advertisements for Help Wanted not exceeding fifty words One Dollar each insertion. Additional words two cents each.

A BRIGHT, ENERGETIC and reliable man to sell belting in New York and vicinity. Address "MANUFACTURER," care G. T. Moore, 91 Liberty St., New York.

FIRST-CLASS FOUNDRY pig iron salesman; one who is acquainted with Ohio and Western Pennsylvania districts; sober, industrious, energetic man. Apply with references and salary expected, "SALESMAN," Box 315, office of *The Iron Age*, 96-102 Reade St., N. Y.

FOREMAN for pattern department; must fully understand iron patterns for cored castings; permanent position if satisfactory; state experience and address "CORED CASTINGS," office of *The Iron Age*, 96-102 Reade St., N. Y.

AT ONCE.—An AI Sales Agent possessing extensive and intimate connection with Western Railroads for steel plates, axles and forgings; only a really first-class man will be considered and to such a one a liberal salary and expenses will be paid. Address in confidence "WEST," office of *The Iron Age*, 96-102 Reade St., New York.

TRAVELING SALESMAN, by a strictly first-class brick manufacturer; a man with experience in this line, or at least with considerable knowledge of metallurgical processes, preferred; give reference, age and experience. Address "BRICK," Box 156, Allegheny, Pa.

SALESMEN selling to hardware trade in large cities, also traveling, to sell Lawn Mowers on commission. Address "Box C," Hudson, Mich.

TRAVELING SALESMAN visiting stove and tinware, hardware, house-furnishing or plumbing and gas fitting trade, either retail or jobbing, will learn of something of interest by addressing "B. J. W. & Co.," Look Box 47, Mercer, Pa.

A YOUNG MARRIED MAN, 25 to 30 years old, who has had experience in bookkeeping and buying in a large cornice and tin jobbing works, or has experience in a wholesale and retail tinners' supply house; must be a good penman, quick and accurate at figures; state all places where formerly employed, how long in each place, cause of leaving and duties performed; best of references and bond required; state salary expected; answer above questions fully or no communications will be considered. Address "BOOKKEEPER & BUYER," office of *The Iron Age*, Bank of Commerce Building, St. Louis, Mo.

FOREMAN for steel foundry; must be practically familiar with molding, melting and all details of foundry, and capable of taking full charge of work in absence of proprietor. Address, stating age, experience and salary expected, "STEEL FOUNDRY," office of *The Iron Age*, 96-102 Reade St., New York.

SALESMEN in Arkansas, Miss., Ala., Georgia, So. Carolina and Florida to sell staple line of hardware on commission. Address "EDWARDS," care E. S. ADAMS, office of *The Iron Age*, 312 The Cuyahoga, Cleveland, O.

SITUATIONS WANTED.

Undisplayed Advertisements for Situations Wanted not exceeding fifty words Fifty Cents each insertion. Additional words one cent each.

BY FIRST-CLASS Mechanical Engineer of ability and experience in designing, estimating and building medium and heavy machinery of any description and structural work, also in managing, soliciting, &c. Address "T. V.," 1149 N. Clark St., Chicago.

BY AN EXPERIENCED Traveling man, well known by the hardware trade in New York State, a line of staple goods that can be sold largely from catalogue, as a side line, on commission. Address "STAPLE GOODS," office of *The Iron Age*, 96-102 Reade St., New York.

BY A YOUNG MAN with several years' experience in full line of general and builders' hardware, cutlery, etc., in store or on the road with jobbers; good references given. Address "P. O. Box 250," Brink Haven, Ohio.

UP TO G IN HARDWARE—The undersigned, having many years' experience in hardware in New York City, is now open to engagement; for further particulars or interview, address GNO. MARKGRAF, Woodhaven, Queens Co., N. Y.

YOUNG MAN six years in hardware business, wholesale and retail, wants situation in good business house; unquestionable references from present and former employers; desires position where he can push ahead and advance himself. Address "J. M. H.," 322, office of *The Iron Age*, 96-102 Reade St., New York.

BY A MECHANICAL and **HYDRAULIC** Engineer; experienced designer of hydraulic plants for the manufacture of solid drawn seamless steel tubing (for bicycles, boilers, hydraulic presses, &c.), gas and air vessels, shells and hydraulic forgings; competent to manufacture said articles; highest references. Address "HYDRAULIC," office of *The Iron Age*, 96-102 Reade St., New York.

A YOUNG MAN at present bookkeeper for a large engineering and manufacturing company, thoroughly posted in all business methods, desires a position where his duties will require some outdoor work or traveling; no objection to any part of United States; highest testimonials. Address "POSTED," No. 322, office of *The Iron Age*, 96-102 Reade St., New York.

STEEL SALESMAN, with a thorough knowledge of the merchant steel, iron, barbed and plain wire, nail, cold rolled steel and plow shape trade, will be open for engagement April 1; have had ten years' experience and large acquaintance with the trade East and West. Address "STEEL SALESMAN," office of *The Iron Age*, 96 102 Reade St., New York.

FOUNDRY PIG IRON SALESMAN desires position by 1st prox.; please state territory to be traveled. "FOUNDRIY IRON," office of *The Iron Age*, 96-102 Reade St., New York.

FOUNDRIY PIG IRON SALESMAN.—Engagement desired with a first-class firm by an active man, 35 years of age, who has had large experience in the manufacture of foundry and Bessemer irons and who is favorably known in the iron and foundry business generally as a thorough expert on modern foundry practice. Address "MIXTURES," Box 322, office of *The Iron Age*, 96-102 Reade St., New York.

AS MASTER ROLL TURNER and Designer; 28 years' experience on rails, beams, tees and channels, also sheet, plate, merchant bars and wire rods; willing to work in Canada or United States. Address "ROLL TURNER, P. H.," 115 42d St., Pittsburgh, Pa.

BY A TRAVELING SALESMAN, thoroughly experienced in full line of general and builders' hardware, cutlery, guns, tinware, &c.; has been manager of retail business; position in any above lines in store or on the road, with jobbers, manufacturers or manufacturers agents. Address "BUILDERS HARDWARE," office of *The Iron Age*, 59 Dearborn St., Chicago.

FORCE of traveling salesmen of a house of highest rank, open for special work or side lines during ensuing six months. Experienced in implementing hardware, vehicles, etc. Cover thoroughly the Ohio Valley, Southern and Southwestern States. Address "EXTRA CAPACITY," care Bradstreet's, Louisville, Kentucky.

IRON SALESMAN.—A live, energetic man, having a thorough knowledge of the iron trade, ten years' experience and large acquaintance in the Middle States, desires a responsible position; that of pig iron salesman preferred; can give highest recommendations of ability and character. Address "F. B. C.," office of *The Iron Age*, 220 S. 4th St., Philadelphia, Pa.

BOOKKEEPER.—A thorough accountant and business man of 18 years' experience in banking and iron and steel manufacturing industries desires a situation where ability and experience are necessary; will give you best of references; no objection to city or country. Address "BOOKKEEPER," office of *The Iron Age*, 220 S. 4th St., Philadelphia, Pa.

AS FOREMAN, by a thorough practical foundryman having several years' experience as foreman; thoroughly understands handling men; foundries having a specialty preferred; best of references given. Address "YEARS' EXPERIENCE," office of *The Iron Age*, 96-102 Reade St., New York.

MECHANICAL ENGINEER with European and extensive American practice, 52 years old, speaking English, French and German, wishes to represent American manufacturer at Antwerp Exposition; represented prominent American firm at late World's Columbian Exposition. Address "EXPOSITION," office of *The Iron Age*, 96-102 Reade St., New York.

BY A foundry foreman of long experience, where ability and faithful services will be appreciated; understands cupola practice thoroughly; good record; distance no object. Address "THOROUGH," office of *The Iron Age*, 96-102 Reade St., New York.

AGENCY WANTED.—Advertisers having established trade in Middle and Eastern States and large warehouse, desire to add a first-class agency. Address "G. H. M.," Box 15, office of *The Iron Age*, 96-102 Reade St., N. Y.

BY MIDDLE AGED married man; has had years of experience as bookkeeper, special accountant and general office work in manufacturing business; well versed in details of foundry and machine shop work; excellent references. Address "WELL VERSED," office of *The Iron Age*, 96-102 Reade St., New York.

SELLING AGENCY WANTED, for blast furnace and iron and steel works products, by a gentleman having extensive acquaintance among railroads, foundries and shops. Address "AGENT," No. 111, office of *The Iron Age*, 96-102 Reade St., New York.

SOLE AGENCY for the East of some good hardware specialty; have an extensive acquaintance in the trade. "C. G. V.," No. 31, office of *The Iron Age*, 96-102 Reade St., New York.

BY AN EXPERIENCED hardwareman, buyer and office manager; fifteen years' active service; thoroughly versed in all the detail of general hardware, railroad, mill and mining supplies; competent by education and training to accept position of trust and responsibility; last nine years with present employers; references unexceptionable. "MANAGER," Box 31, office of *The Iron Age*, 96-102 Reade St., N. Y.

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A MAN of many years' experience, has had charge of a large factory where various kinds of mechanical work has been done; well acquainted with handling a large number of workmen to good advantage, making prices, costs, etc.; would like to hear from some manufacturing house who want a sober, active man, with a practical experience; best of references. Address "I. A. C.," No. 222, office of *The Iron Age*, 96-102 Reade St., N. Y.

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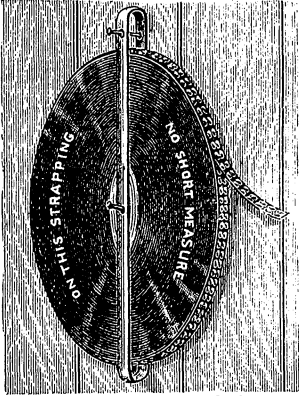
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And yet we think frequently a man who uses asphaltum is justified in emphasizing his remarks when he finds a lot of stuff all granulated and about a quarter of a barrel of dirt and sediment, or if in cold weather he tries to reduce it with naphtha and finds he has asphalt pudding. **MORAL: Use Nubian.**

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CRUCIBLE STEEL CASTINGS.

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Write for our estimate on any work you want, or we will make sketches and designs without charge.

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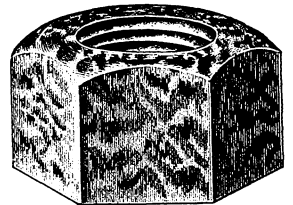
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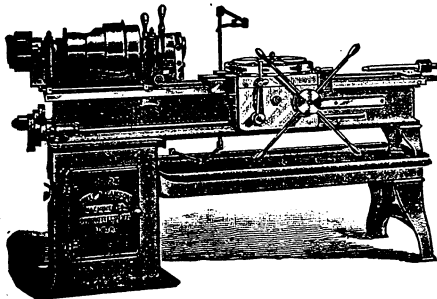
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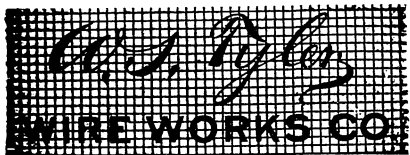
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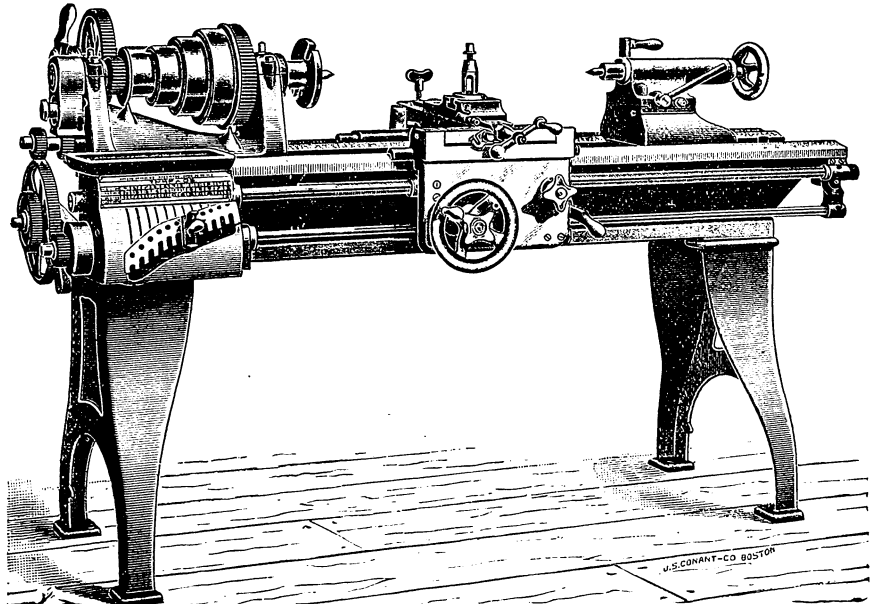
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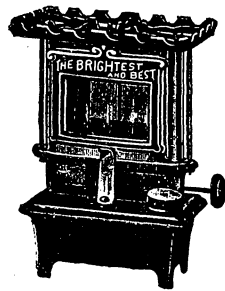
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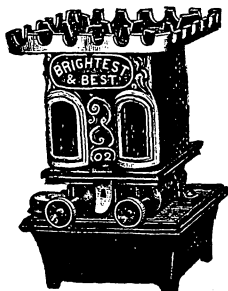
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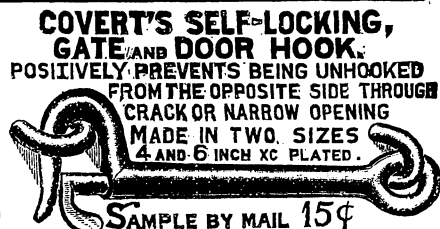
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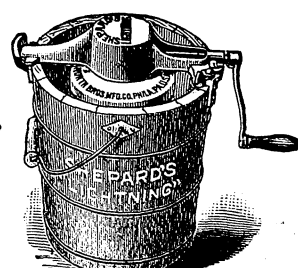
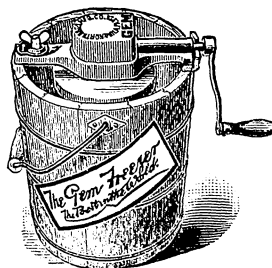
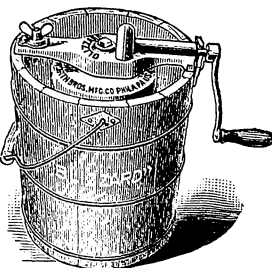
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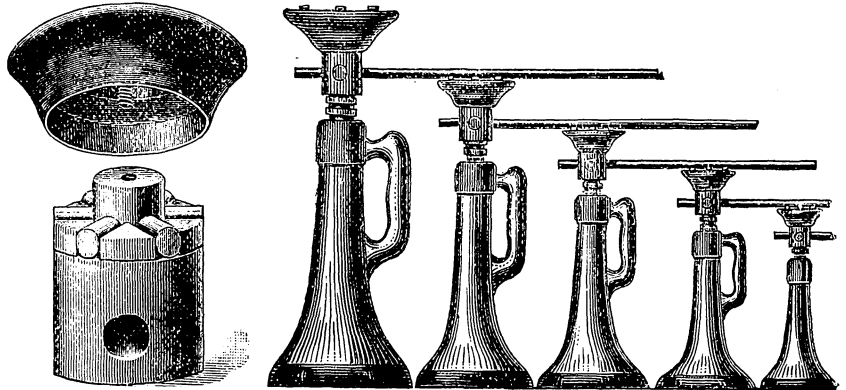
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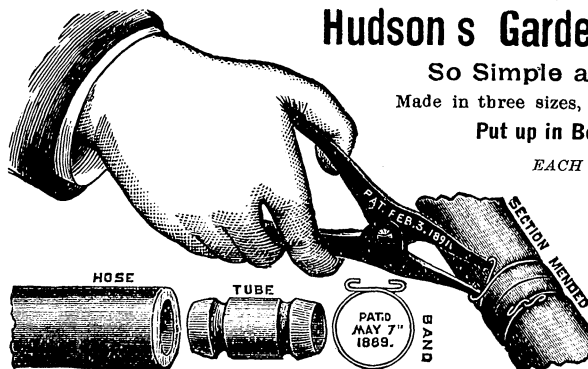
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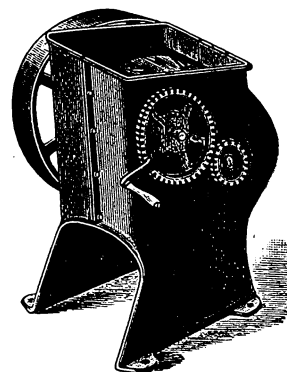
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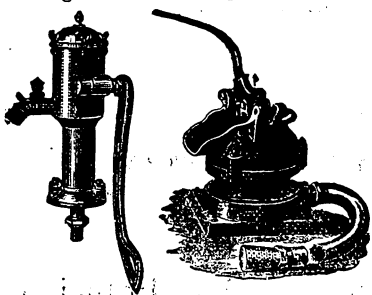
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Fig. 209.

Fig. 381.

Fig. 145.



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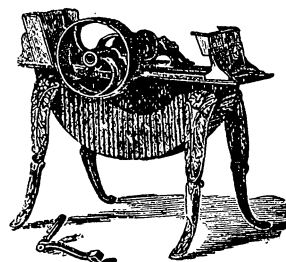
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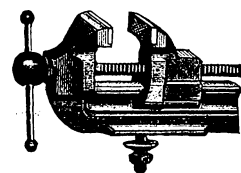
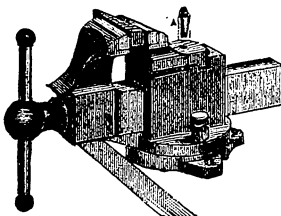
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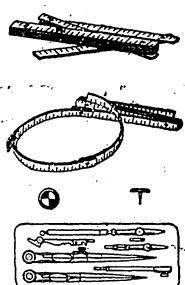
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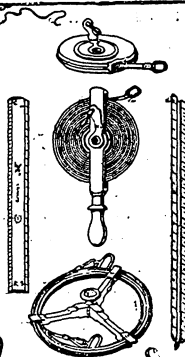
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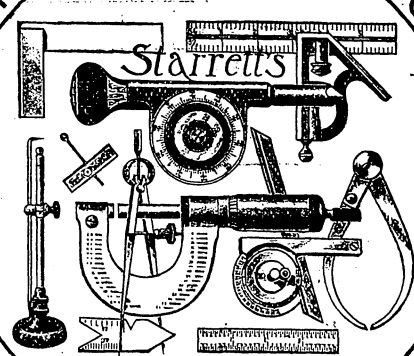


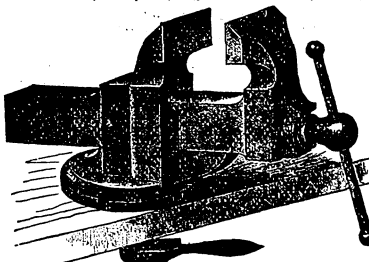
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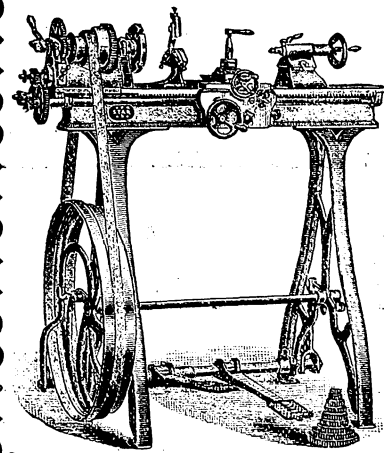


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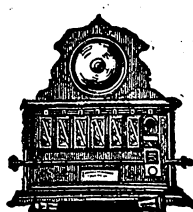
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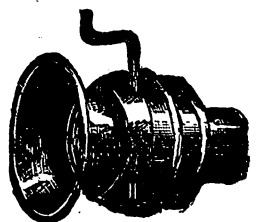
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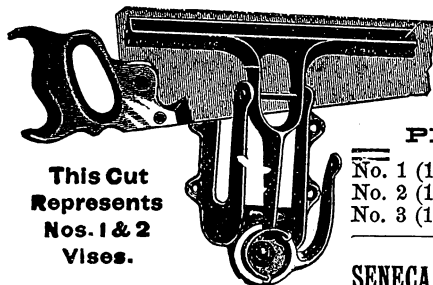
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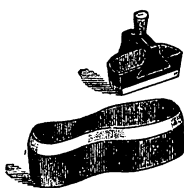
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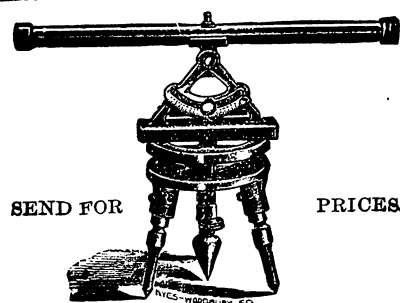


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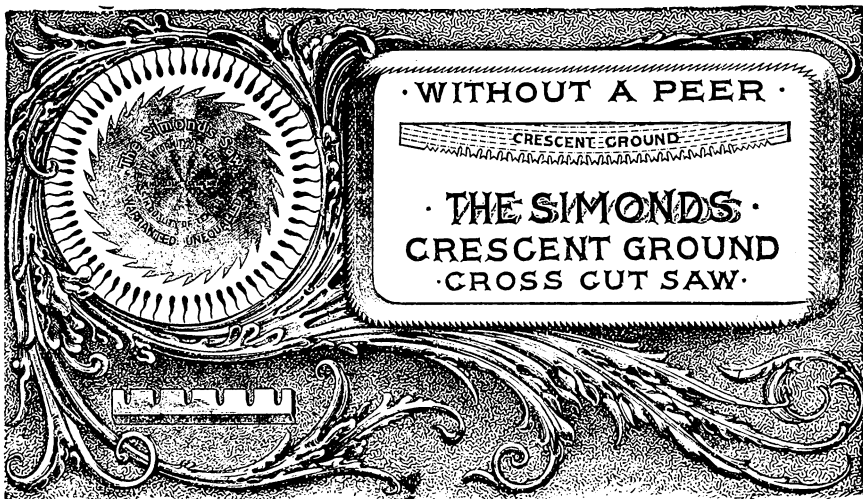
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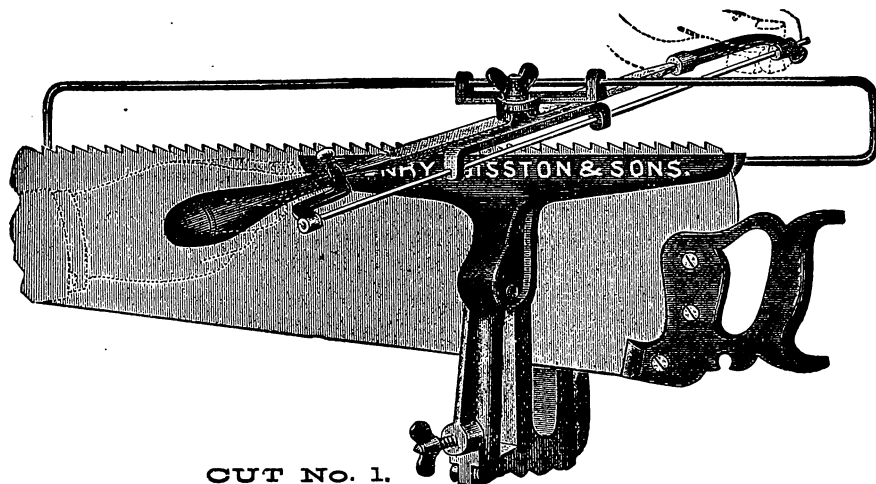
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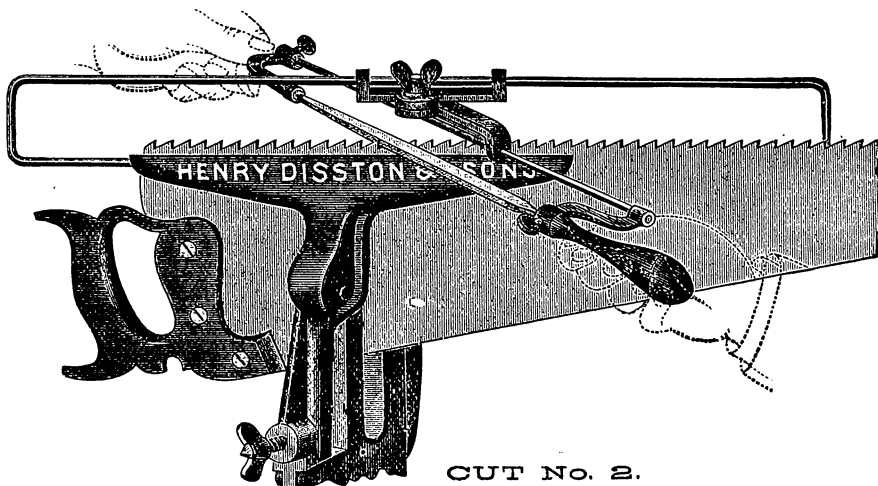
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ESPECIALLY DESIGNED TO ASSIST THOSE NOT SKILLED IN THE ART
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Cut No. 1 shows a saw and the attachment in proper position for filing the first side; and Cut No. 2 shows the saw and attachment reversed and in position to file the second side. There are three marks on one of the hubs of the swivel attachment, and one mark on the other. One of the three marks shows when it is in position No. 1, and the other designates when it is in position as shown in No. 2. The third, or centre, marks show when it is in position for filing Rip Saws.



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To obtain the correct position, loosen the wing nut and move the guide around to the point desired; after tightening wing nut, loosen screw in file handle, then turn handle until file gives the shape tooth wanted.

A good way is to select a tooth of correct shape and let file down into it, tighten set screw in handle, then file a tooth to see if the shape suits. If not turn the file a little to the right or left and try another tooth until the proper shape is obtained. Then file every other tooth, see cut No. 1; when one side is filed, reverse saw and attachment and adjust as in No. 2, and file the other teeth. For Rip Saws, place the file at right angles with the saw and file every tooth. Always keep the file as nearly horizontal as possible.

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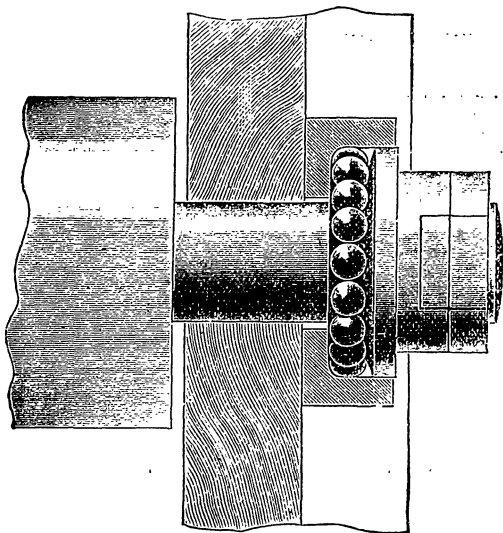
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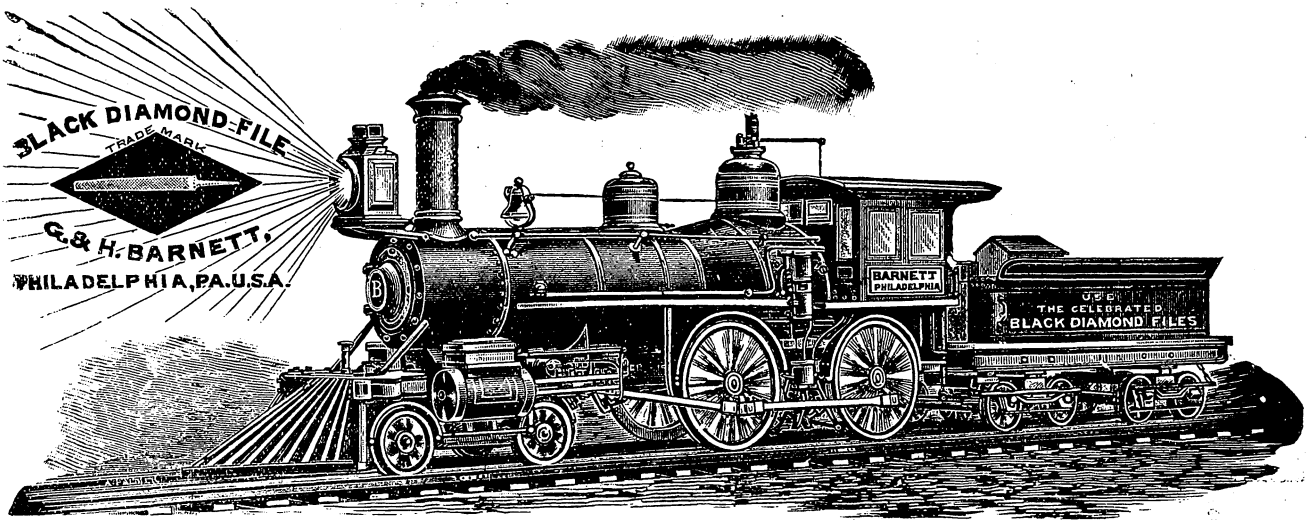
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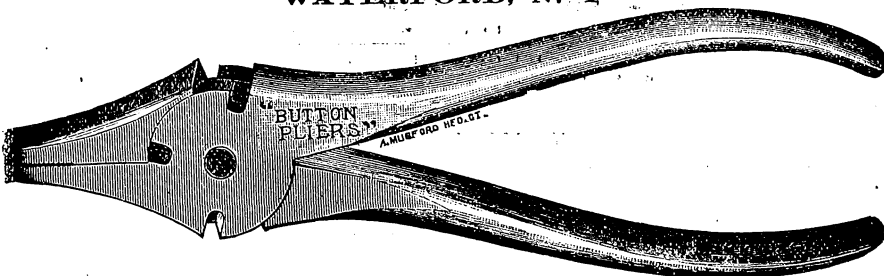
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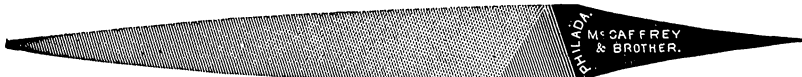
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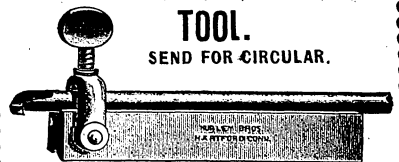
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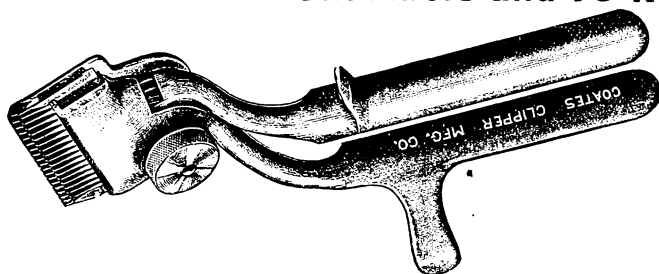
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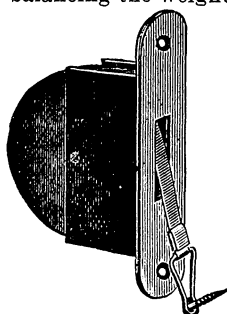
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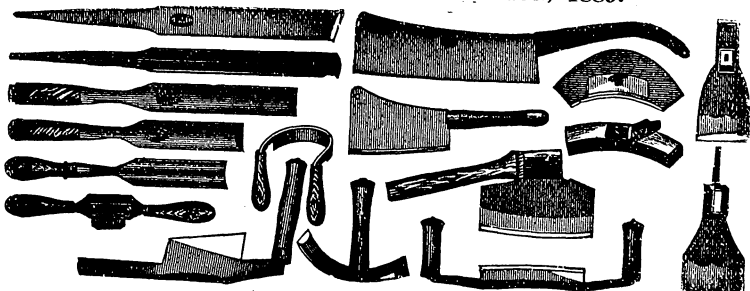
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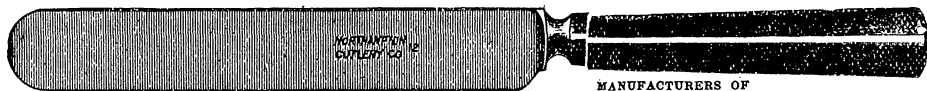
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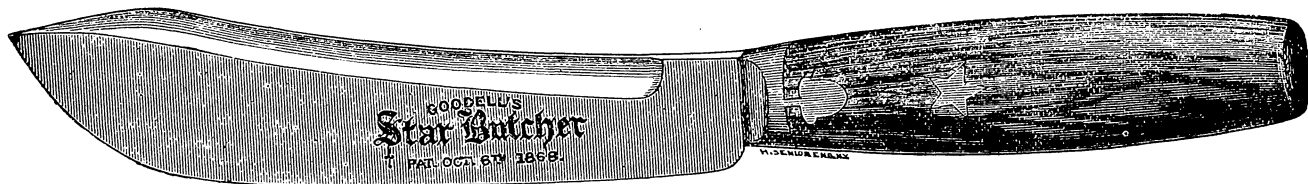
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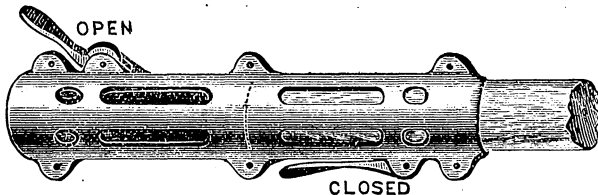
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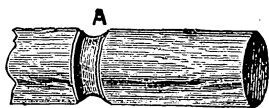
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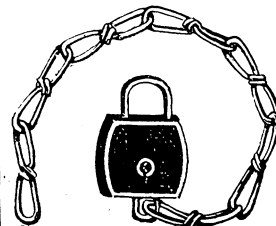
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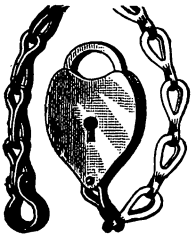
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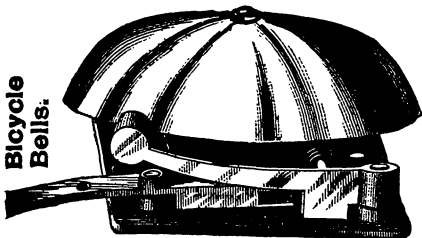


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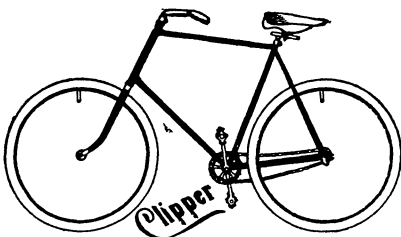
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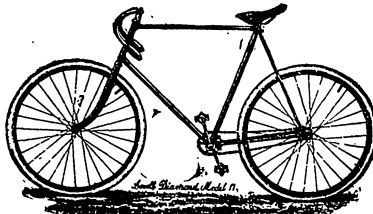
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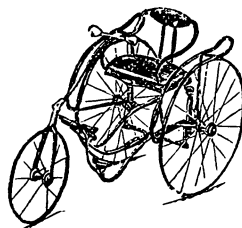
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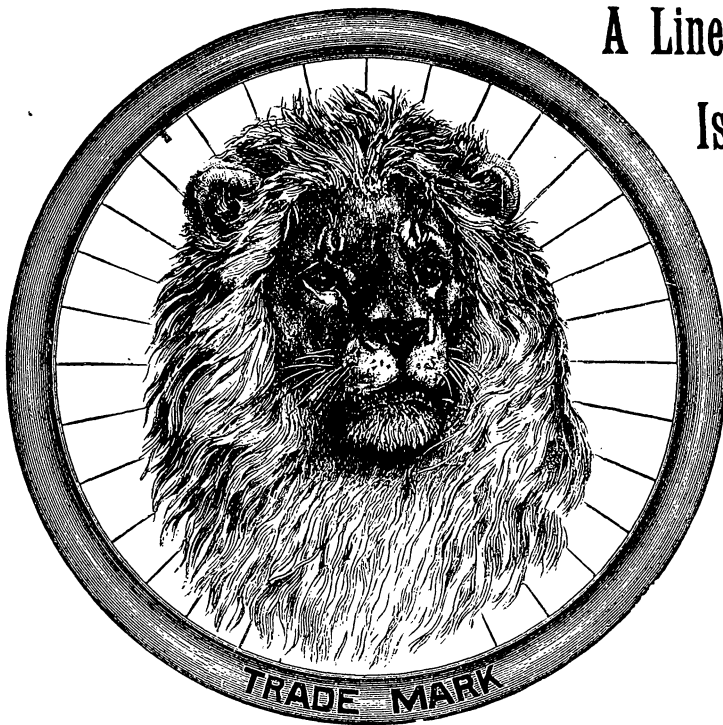
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A wonderful, strong, light wheel, with a dozen points of superiority over all others. Our 'new departure' catalogue (free) tells all about it.

STERLING CYCLE WORKS,
234 Carroll Ave., CHICAGO.

Dog,
Breast,
Sash and Coil,
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KELLEY & McBEAN, Niagara Falls, N. Y., U. S. A.



A Line of Hardware

Is not Complete Without

MONARCH BICYCLES.

They will make you more money than anything you can handle.

At the World's Columbian Exposition they received a general award for all points, including

Design, Workmanship and Finish.

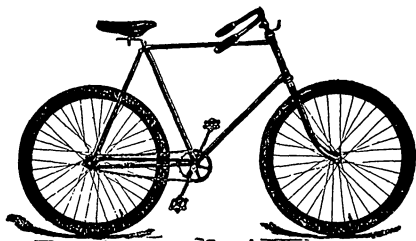
Prices, \$90.00, \$100.00, \$125.00.

Weights, 25 to 34 pounds.

Send for twenty-four page catalogue.

MONARCH CYCLE CO., Lake & Halsted Sts. Chicago, Ill.

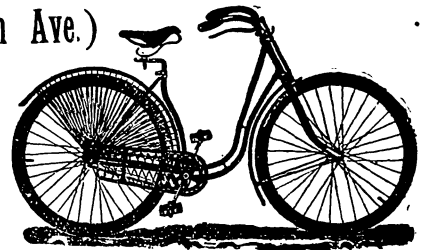
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C. F. GUYON CO.,

Nos. 97 and 99 Reade St., New York,

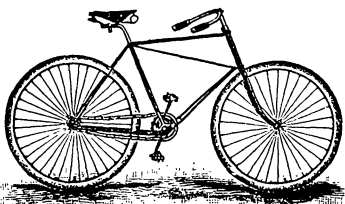
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"The Winton is a Winner."

A high grade, popular, easy selling line of wheels that stay sold. Sure winners for the dealer as well as the Rider.

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Price, \$110.00.

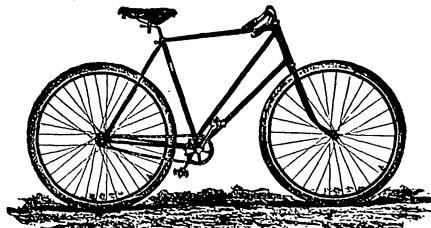
Hardwaremen are uniformly successful bicycle dealers, as the two lines naturally go together and it pays.

We want you with us. Our terms can't be beat. Drop a postal card and have a call from our salesman, "Mr. Catalog."

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Agents for Michigan outside of Detroit.

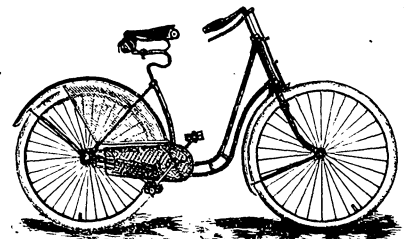
Light Weights!
Strongest Frame in the World!
Wood or Steel Rims!
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WINTON SINGLE FRAME.



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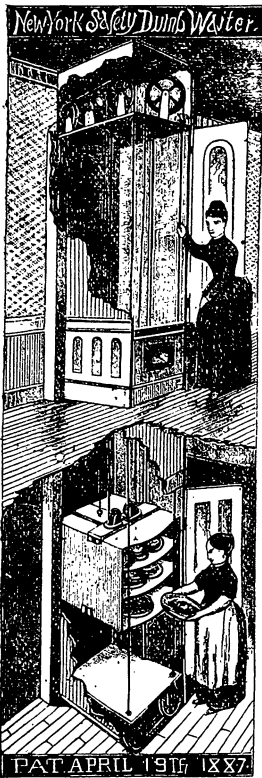
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THE NEW YORK SAFETY.
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THE MANHATTAN, INVALID LIFTS.
CARRIAGE ELEVATORS, ETC.

DUMB WAITERS AND HAND POWER ELEVATORS.

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MANUF'G CO.
NEWARK, N. J.

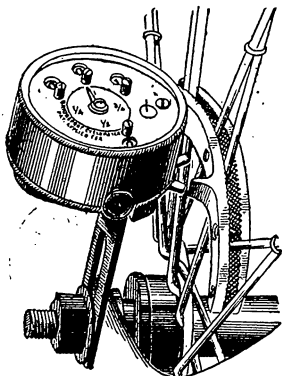
Many thousands of our
Machines in use all
Over the World.

SOLE MANUFACTURERS' AGENTS,

JOHN H. GRAHAM & CO., } 113 Chambers St.,
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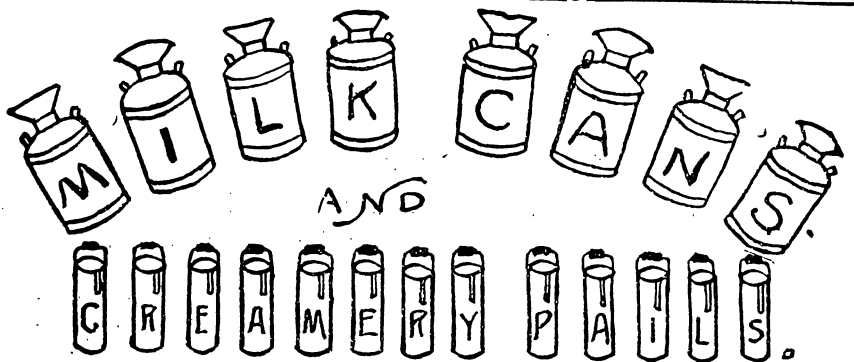
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Registers 1000 miles accurately and repeats, or can be set back to zero at any time. Perfectly Noiseless, Dust Proof and Water Proof. Nothing to get out of order and can be adjusted to any wheel. A high grade cyclometer within the reach of every bicyclist.

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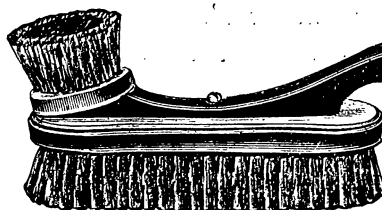
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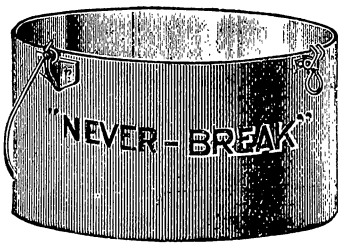


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WROUGHT STEEL COOKING UTENSILS.

MIRROR POLISHED-TINNED-PORCELAINED.

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IS THE Best Street Lamp Manufactured.
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Will Burn Four Hours for One Cent.

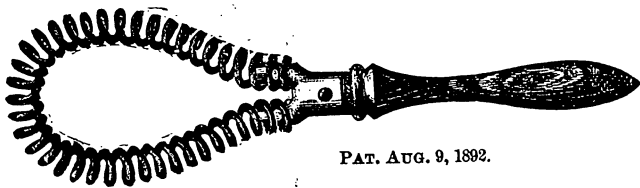
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NEAT, DURABLE, AND DOES THE BUSINESS.

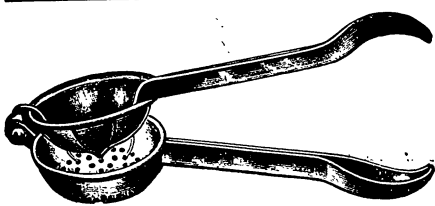
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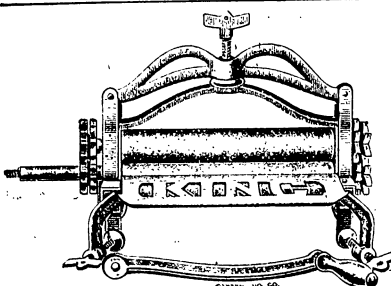
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With Automatic Apron Adjustment.

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We also make all other brands of
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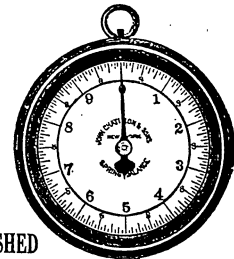
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1835.

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PRICE-LIST.



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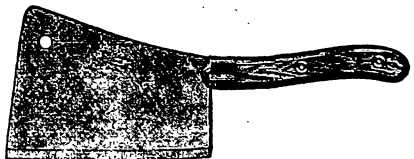
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Sole Agents for

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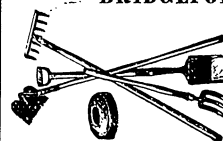
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Makers of a large line of
STANDARD

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MANUFACTURERS OF

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Factory and Salesroom,

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Also Machinists' Tool Chests, empty. Illustrated Cata-
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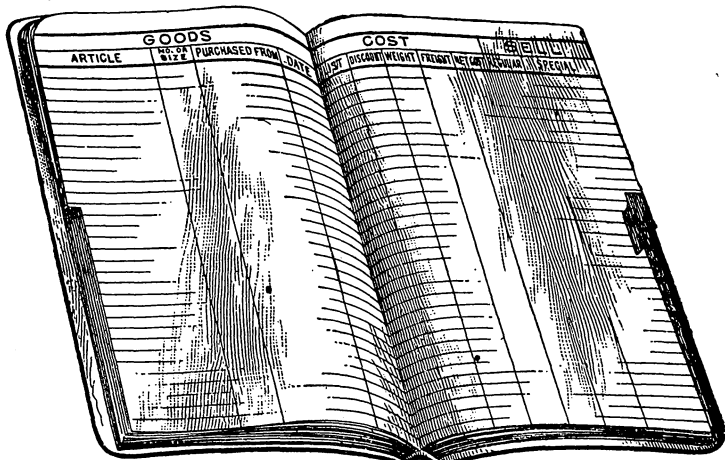
These Books are printed on paper of superior quality and bound in grain seal leather.

Columns are provided for the name and number or size, for noting from whom purchased, date of quotation or purchase, list and discount, and for entering freight expenses as an element of cost. Under the heading of selling prices, the regular and any special price, or remarks in regard to the goods are given place. This book goes into considerable detail in describing the goods and cost prices. It has been arranged in accordance with the views of many Hardwaremen whose methods are careful and exact.

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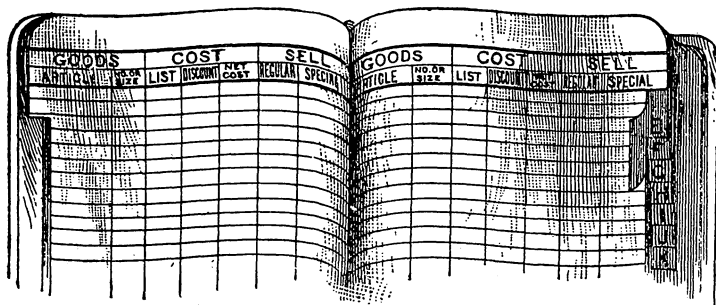
Hardware Price Book A.

In this book each page is complete, and the record of prices does not, as in Book A, run across two pages. Thus it accommodates a larger range of goods with much less detail in the record. It is adapted for office or store use, and by the use of familiar abbreviations, sufficiently large for the convenient and concise record of prices.

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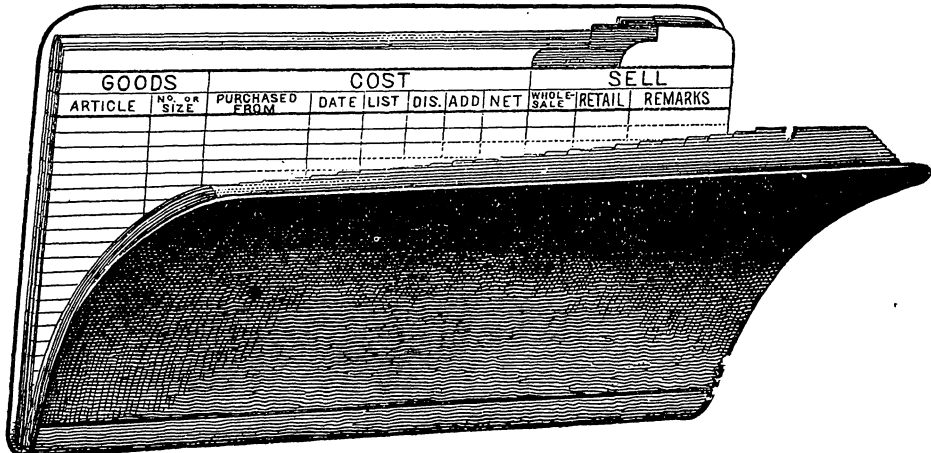
Hardware Price Book B.

The headings in Book C run across the top, in a line parallel with the hinge. In this way a very complete record can be kept on a single page. The details of weight and freight contained in Book A are omitted, and a single column headed "Add" given for the insertion of freight or other expenses which it is desirable to include in the cost. Under the selling prices space is left for the wholesale price, the retail price, and also for any remarks in regard to cost of the goods, desirability of pushing them, or other matters.

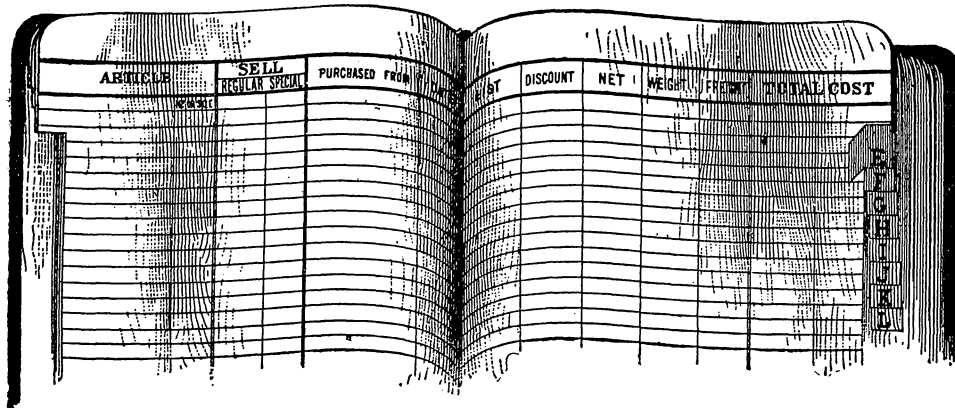
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Hardware Price Book C.



Hardware Price Book D.

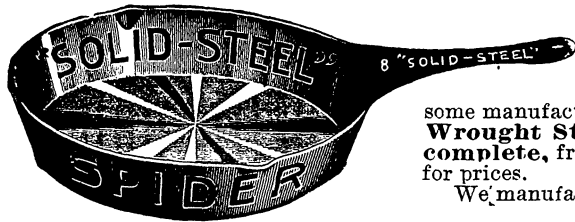
Price Book D will recommend itself particularly for desk and store use, and for salesmen on the road.

The name of the article, its number or size and the selling price are the first to meet the eye on the left-hand page, as embodying information desired when the selling price is required. The other headings follow in convenient order, by which a detailed memorandum regarding the goods may be kept, the whole being seen at a glance. A number of pages at the back of the book are arranged for memoranda, which will be found a great convenience. This arrangement is adapted to the requirements of the trade in this direction.

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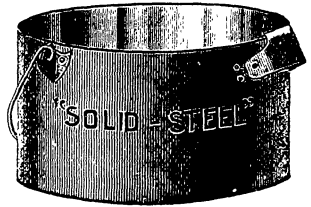
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No Seams, no Rivets in "Solid-Steel" Ware.

Brilliant Finish.

Notwithstanding the claims made by some manufacturers' agents our spiders are made from **Wrought Steel, Without Seams or Rivets.** complete, from a single piece of metal. Write for prices.

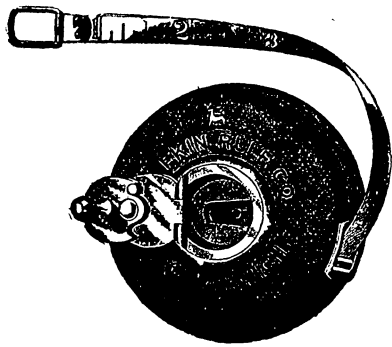
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The Cleveland Stamping & Tool Co., Cleveland, O.

We do Light and Heavy Stamping and Blanking. Also build Dies and Stamping Machinery.

**"RELIABLE"
Steel Measuring Tapes.**

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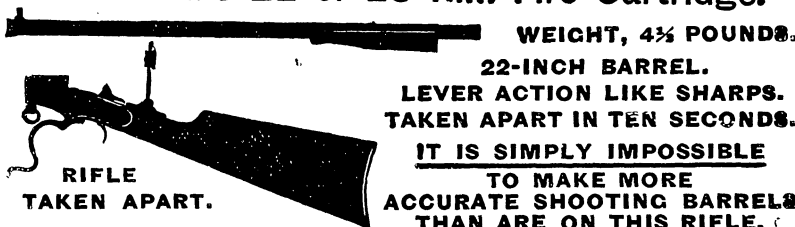
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STEVENS' "FAVORITE" RIFLE.**

SHOTS AT 40 FEET. 10 SHOTS AT 40 FEET. 10 SHOTS AT 40 FEET.

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LONG RIFLE 22 SHORT UCB N91

ABOVE TARGETS ARE
ACTUAL SIZE.

Made for the 22 or 25 Rim Fire Cartridge.



RIFLE
TAKEN APART.

WEIGHT, 4 3/4 POUNDS.
22-INCH BARREL.
LEVER ACTION LIKE SHARPS.
TAKEN APART IN TEN SECONDS.
**IT IS SIMPLY IMPOSSIBLE
TO MAKE MORE
ACCURATE SHOOTING BARRELS
THAN ARE ON THIS RIFLE.**

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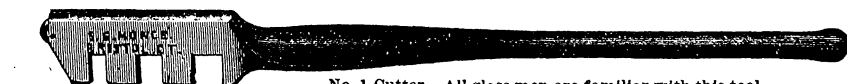
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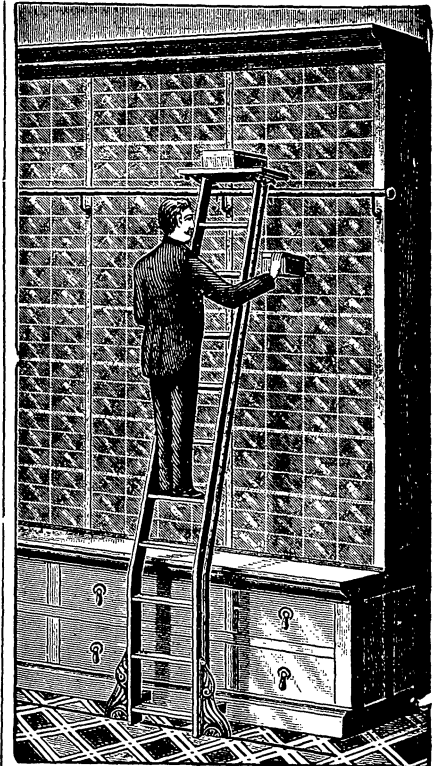
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No. 1 Cutter. All glass men are familiar with this tool.

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Can be applied to any kind of shelving made. See this space next week for other styles.

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**PURE ALUMINUM COOK-
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Meeting with such universal appreciation, we think it to our interest to appoint **ONE** responsible firm of Hardware Merchants in **EACH** town and city as our sole agents.

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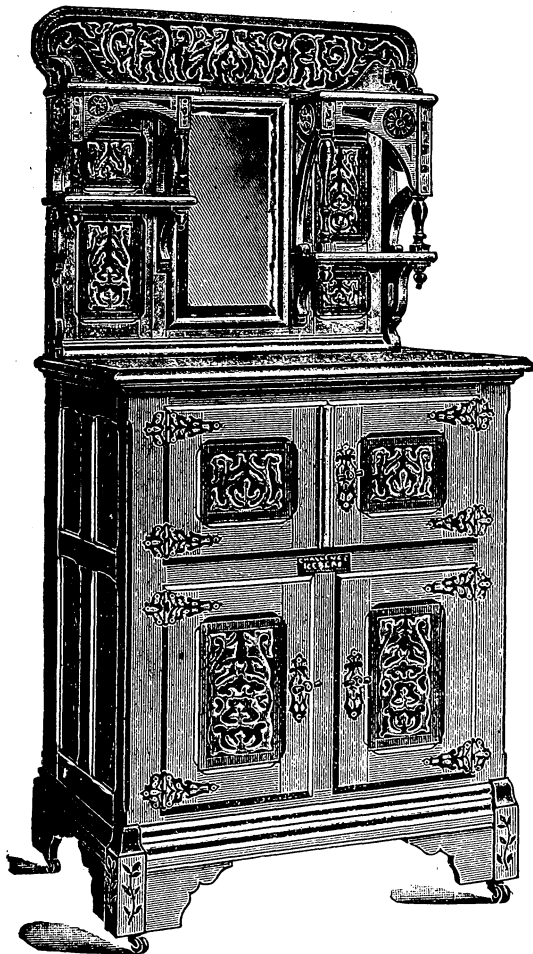
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BUY THE BEST. THE Challenge Iceberg Refrigerators,

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Write for our large Illustrated Catalogue for 1894.

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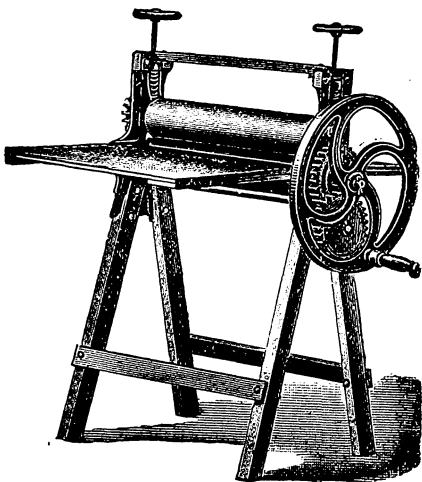
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WARRANTED TO DO
Better Work than Hand-Work.

SAVES all the fuel,
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We Guarantee Every Machine.



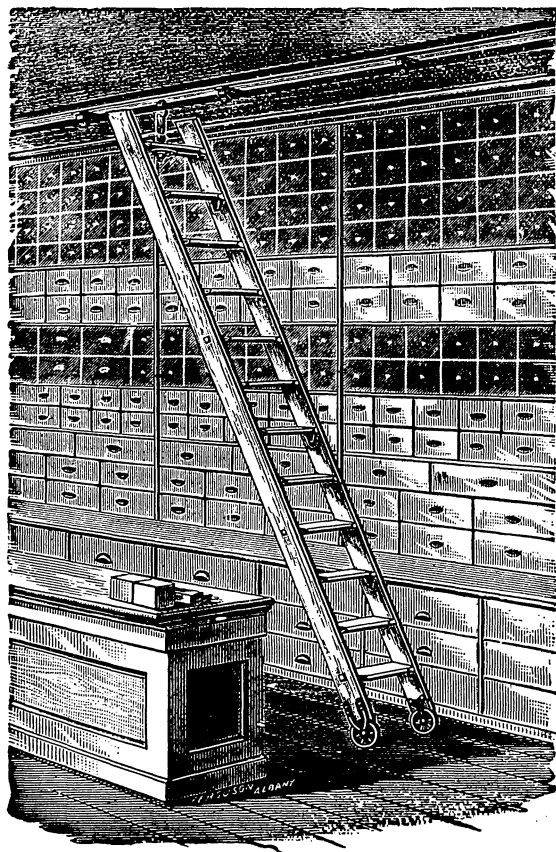
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NEW BRUNSWICK

THE "NOISELESS" STORE LADDER.

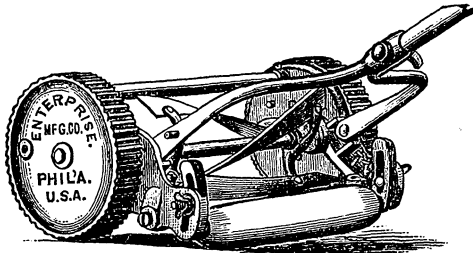


The latest and best. Perfectly noiseless. Neat in appearance.

Manufactured by
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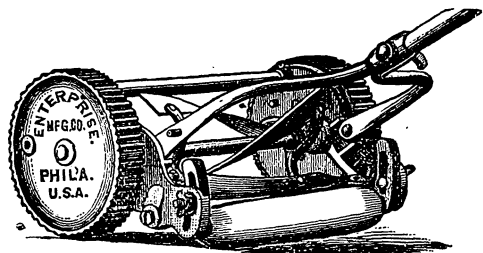


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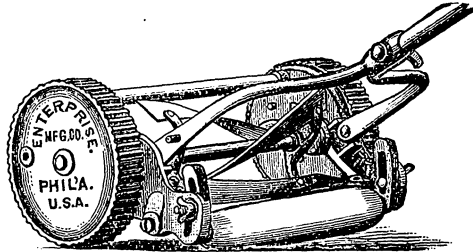
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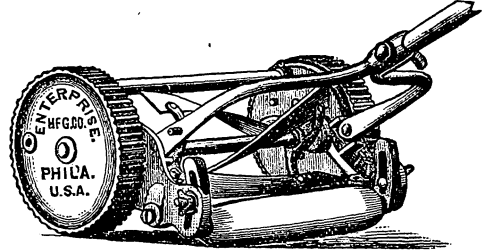


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EQUAL TO
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Prices quoted
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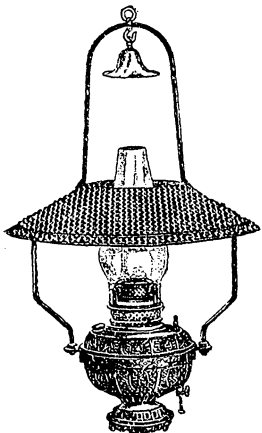


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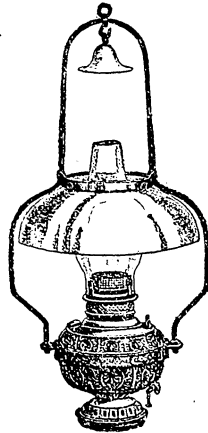
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With 20-inch Tin Shade.

No. 858. Size 3.

Enlarged Oil Pot
No Smoke.
No Smell.
Cheaper and Better than Gas.
300 Candle Power.
Holds One Gallon Oil.
Burns Brightly about 10 hours.



With 14-inch Dome Shade.

The Banner is the only Fount having Extra Feeder Wick which supplies oil to the Burning Wick. Harp has our Patent Extension Band, allowing Fount to pass down and through instead of lifting over as in the old style harp. Flame is regulated by our Improved Ratchet Movement. This Movement gives an exactness and nicety in adjusting that is not possible in any other wick raising device.

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Carry Stock of Jackson, Mich., Farming Tools

Shipments from Factory if preferred.

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This Machine illustrates in combination a simple and effective mechanism, all metallic parts of which are heavily galvanized, and a body of selected Virginia White Cedar, of all woods the one least affected by contact with water.

Seasoned White Cedar frequently lasts one hundred years, whereas the buyers of Washing Machines very seldom do, consequently the purchaser of a Columbia Washer secures in it an heirloom for the next generation.

We shall be pleased to send you full details of the Columbia Washer.

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We are now making solid nonbreakable hoops of heavy wire, viz., the

Electric-Welded Wire Hoop,

which is practically indestructible, and are applying such to our Best White Cedar Ware in a manner that renders it vastly superior to all other forms of construction. These Welded Hoops are imbedded, by a patented process, in grooves prepared for them on the outside of the vessel, and they grip the staves with a firmness that time and wear are alike unable to relax. As in the case of the Columbia Washer, the "Pale Messenger" will probably overtake most purchasers of these goods with a serviceable article still in use. Send for Circular.

Richmond Cedar Works,
RICHMOND, VA.

American Stamping Co.,

Manufacturers of

All Kinds of Tinware and Sheet Metal Goods.

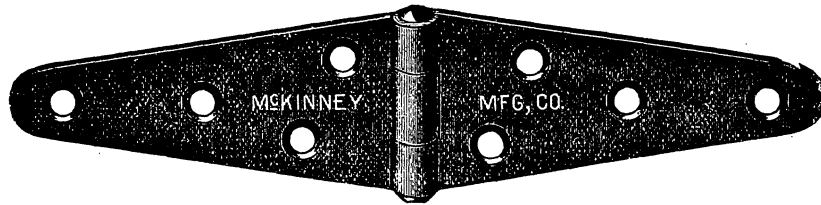
N. Y. Office and Salesroom, 104 & 106 John St.
Factory, 103 to 119 N. 3d St., Brooklyn, E. D., N. Y.

STEEL HINGES AND BUTTS.

— STANDARD GOODS. —

McKINNEY MFG. CO.. - ALLEGHENY, PENN.

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ORDERS FILLED
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"NONE BETTER."

BARN, MILL AND FIRE DOOR HANGERS HIGHEST AWARD

at WORLD'S FAIR, 1893,

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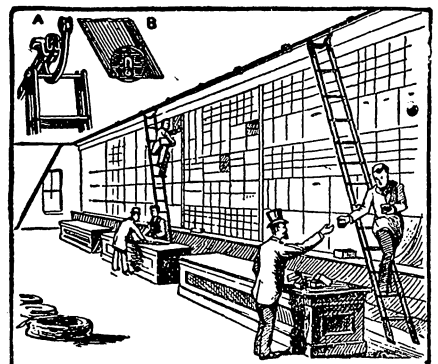
Parlor, Barn and Fire Door
Hangers.

SEND FOR CATALOGUE.

COBURN TROLLEY TRACK MFG. CO.
HOLYOKE, MASS.

Fire Door Hangers. Best in the World. Equipped
with Automatic Fire Door Fittings.

We make four styles of ROLLING LADDERS to
reach shelving of any height.



P. & F. CORBIN,

New Britain, Conn.

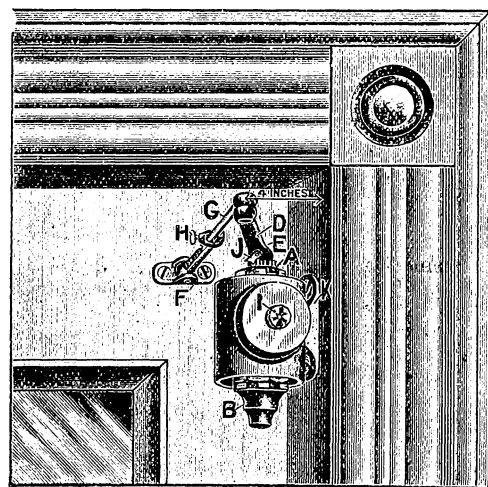
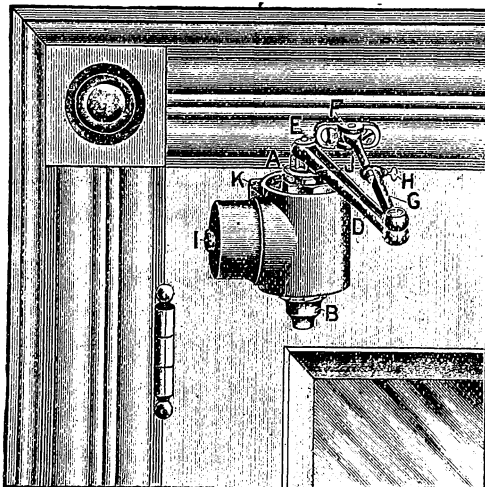
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Easily
Adjusted
and Adapted
for all
Requirements.

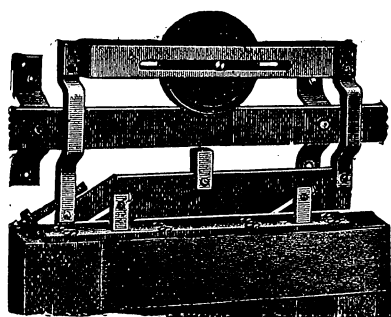


Looks Well,
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LIQUID DOOR CHECKS AND SPRINGS,

Fine Builders' Hardware. Wood AND Machine Screws.

Catalogues and Prices Furnished on Application.



LANE'S PATENT NOISELESS STEEL PARLOR DOOR HANGER.

This Hanger is made of Steel.
The Wheel is also Steel, except the filling or tread.
The Track is of Steel—a single one only.
The Hanger is Anti-Friction.
More nearly Noiseless than any other.
Ease of adjustment.

Can be erected with half the labor others require.
Track will not swell, shrink or warp out of true.
No cutting of doors.
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Simplicity in all its parts.
Durability.

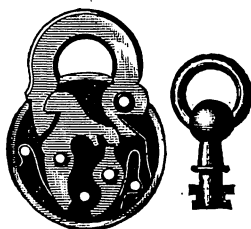
ALSO LANE BARN DOOR HANGER AND TRACK. SEND FOR CIRCULARS.

Manufactured by

LANE BROS., Poughkeepsie, N. Y.

JOHN H. GRAHAM & CO., General Agents, 113 Chambers St., New York.

PATENT PERFECTION PADLOCK.



Eight Tumblers, Key Turning Both Ways.

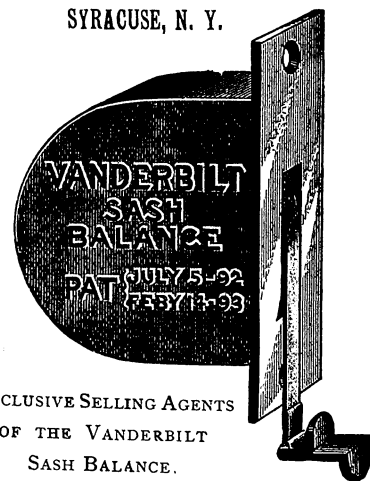
Sizes, $\frac{1}{4}$ inch to $2\frac{1}{4}$ inches, of cast bronze. Defies competition for quality and price. No steel or iron used, cannot rust, and cannot be picked. Also, $\frac{1}{2}$ and $\frac{3}{4}$ inch Padlocks, opened with a common pin, in brass and nickel, for cats and small dogs. The best Railroad Switch and Car Lock in the world.
Adopted by the United States Treasury for bonded warehouses.

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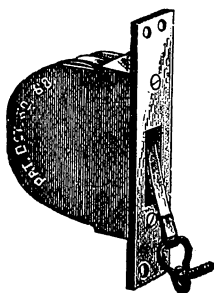
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EXCLUSIVE SELLING AGENTS
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SASH BALANCE.



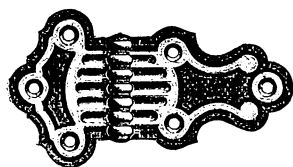
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To buy an inferior article, which your trade condemns, when you can get

THE CALDWELL SASH BALANCE.

The best material, right principle and care in making and testing have made it the **LEADER** for five years. Write to

CALDWELL MFG. CO., Rochester, N. Y.



CORRUGATED WROUGHT BRASS HINGES,

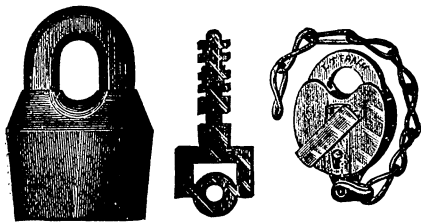
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Original and Striking Designs in a Great Variety of Finishes.

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ESTABLISHED 1879.
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Originators, designers, patentees and manufacturers of all the leading popular styles of **PADLOCKS**, Key-Locking Scandinavian with our patent Inter-Locking Tumblers; the only reliable lock of this style ever made. **SELF-LOCKING** Scandinavian of the highest type of perfection. Dust Proof Railroad, Freight Car and Switch Padlocks. Brass, Bronze, Steel and Malleable Iron Padlocks for all purposes and in all finishes. 131 different kinds. Write for our new 100-page catalogue.

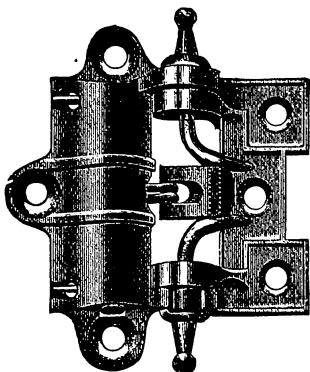
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NEW IDEA SPRING HINGE

Holds the door strongest when closed.



Resistance gradually decreases in opening

and increases in closing the door.

A covered (patented) hold-back Spring Hinge. Full particulars, free Sample and Prices by mentioning this paper.

STOVER MANUFACTURING CO.,

145 River St., Freeport, Ill.

READING HARDWARE COMPANY.

We manufacture the
Celebrated "Duplex"
Wrought Butts—
Wrought Steel and
Wrought Bronze.

They are better than
the ordinary kinds in
every way.

NEW YORK, PHILA., CHICAGO.

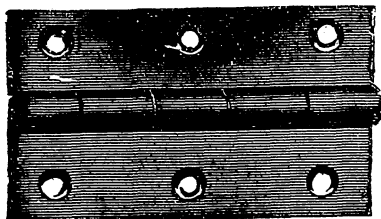
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Porcelain Lined Lemon Squeezers



Best Common Mouse Traps, Steak Hammers, Boot Jacks, Lap Boards, Beacon Hill Pat. Mouse Traps, Mallets, Bung Starters, Hand Screws.

Ripley Mfg. Co., Unionville, Conn.



Cast Brass Butt Hinges

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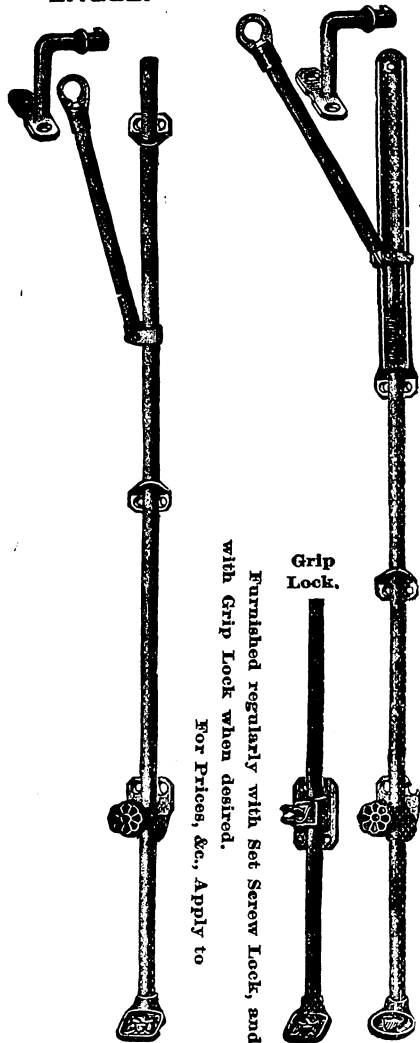
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TRANSOMLIFTERS

"EAGLE."

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Furnished regularly with Set Screw Lock, and with Grip Lock when desired.

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THE WILCOX & HOWE COMPANY,
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MANUFACTURERS OF

A Full Line of Carriage Hardware
ALSO SPECIAL FORGINGS.

Estimates cheerfully given. Send for Catalogue

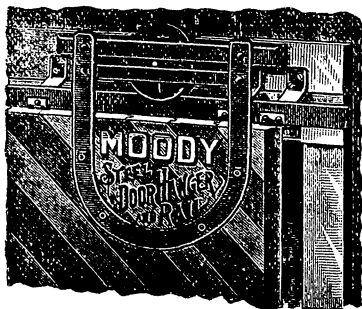
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E. E. BROWN & CO.,

McKean and Meadow Sts.,

PHILADELPHIA PA.

VICTOR MFG. CO., Newburyport, Mass. STEEL RAIL.



Showing one-half set of hangers attached to door.

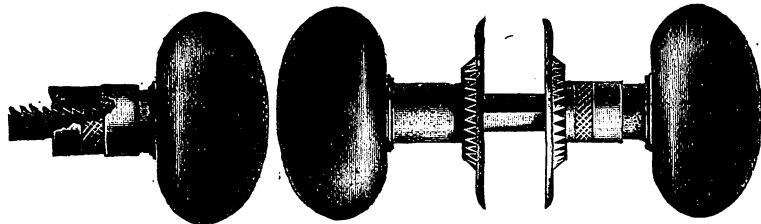


The Only Bracing Bracket Made.

PRICE-LIST.

HANGERS.	Per Dos. prs.
No. 5, to run 8 feet, 3 1/4 in. wheel,	\$10.00
No. 6, to run 10 feet, 4 1/4 in. wheel,	15.00
No. 7, to run 15 feet, 5 1/4 in. wheel,	22.00
RAIL, per foot.....	6 1/2 cents.

Sectional cut showing construction of Knob.



Half size cut of knob as applied to door. NO SIDE SCREWS OR ADJUSTING WASHERS.

Don't you want your stock to represent the latest and most improved up to date Hardware? The Whipple Patent Door Knob is the latest and best Door Knob attachment ever made. Give it a trial. **PERRY & WHIPPLE CO., New Haven, Conn.**
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MANUFACTURER OF

**Finest Carriage Forgings, Coup-
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Special Drop
Forgings.**

Medal Awarded at World's Fair,
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TACKLE BLOCKS

—MADE BY—

The Cleveland Block Co.,

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ARE BETTER IN EVERY WAY.

No waste material. Every ounce of weight in the line of strength. No clumsy outside straps or bolts. As light as wooden blocks and vastly more durable. They wear, but never break. Sheaves interchangeable

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SASH WEIGHTS!

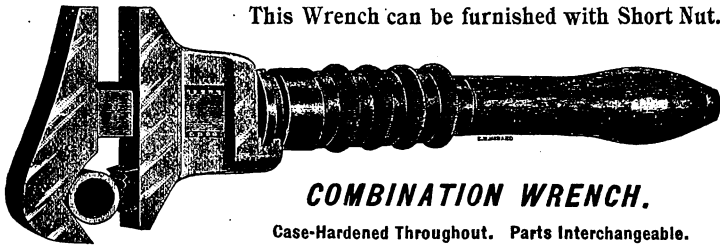
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Office: 813 Masonic Temple, CHICAGO.

WORKS AT MAYWOOD, ILL.

BUFFALO SCALE CO., Buffalo, N. Y. SCALES OF ALL KINDS.



This Wrench can be furnished with Short Nut.

COMBINATION WRENCH.

Case-Hardened Throughout. Parts Interchangeable.

This wrench not only combines the superior qualities of a Gas Pipe Wrench but also all the requisite combinations of a regular Nut Wrench, thus making a combination which has no equal. For Circulars and Price-List, address

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TRIMO PIPE WRENCH,

Forged Steel

All parts interchangeable.

Grips firmly without loss of motion. Releases readily. Never locks. Causes no trouble in close quarters. Does not crush the pipe.

TRIMO CHAIN PIPE WRENCH.



Superior in strength and ease of operation. COMPLETE circular grip. Never slips nor crushes.

Can be used with one hand and in closer quarters than any other Basin Wrench. Parts Interchangeable.

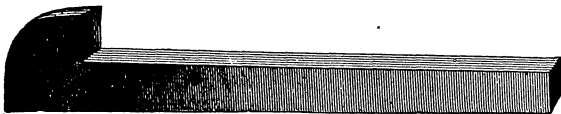
TRIMO BASIN WRENCH.

TRIMONT MFG. CO., ROXBURY MASS.

Drop-Forged Steel Keys.

(Eleven Sizes, 3-16 in. to 1 in. inclusive.)

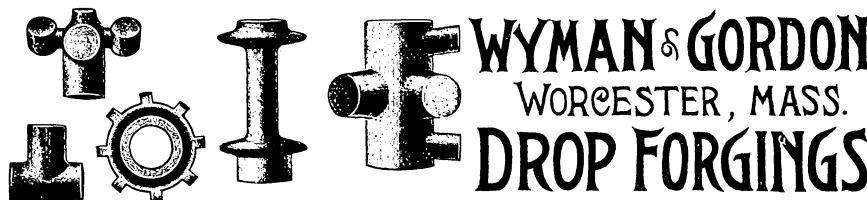
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Send for price-list to

J. H. WILLIAMS & CO., 9-15 Richards St., Brooklyn, N. Y.

Makers of Brock's Patent Chain Pipe Wrench. Standard and Special Drop-Forgings of every kind.



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WORCESTER, MASS.
DROP FORGINGS

COMBINATION PLIERS.

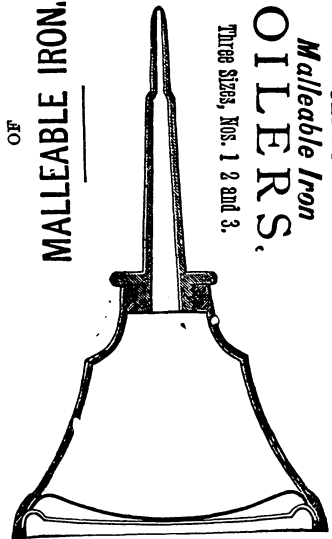


Gas Pliers
Wire Cutters
Wrench and
Screw Driver
Combined.

DROP-FORGED FROM BEST TOOL
STEEL AND FINELY FINISHED.

THE BILLINGS & SPENCER CO.
HARTFORD, CONN.

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MALLEABLE IRON.



New Improved
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Malleable Iron
OILERS.
Three Sizes, Nos. 1, 2 and 3.

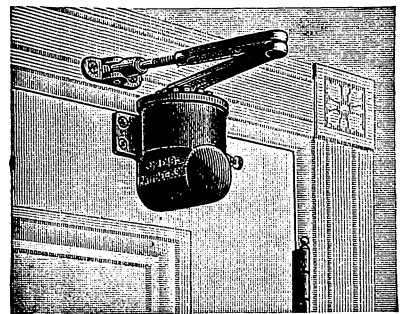
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Mall. Iron Hand Lamps.
M. I. Hanging Lamps.

New Pattern Heavy Screw Clamps.
Strongest in the market.

For Sale by all the Principal Hardware Dealers.
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MALLEABLE IRON CASTINGS
of superior quality, and Hardware Specialties
in Malleable Iron, made to order.

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Bardsley's Liquid Door Check and Spring.

Perfect in action, durable, neat in appearance, low in price and fully warranted. Responsible Agents wanted in the principal cities.

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HARDWARE DEALERS

CAN RECOMMEND THE

CHAMPION METAL WINDOW SASH CHAINS

to their customers as a reliable substitute for Sash Cords, very strong and lasting (some in daily use ten years), and gives thorough satisfaction wherever used. The patented attachments are very simple and can be applied to any window.

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Write for Prices.

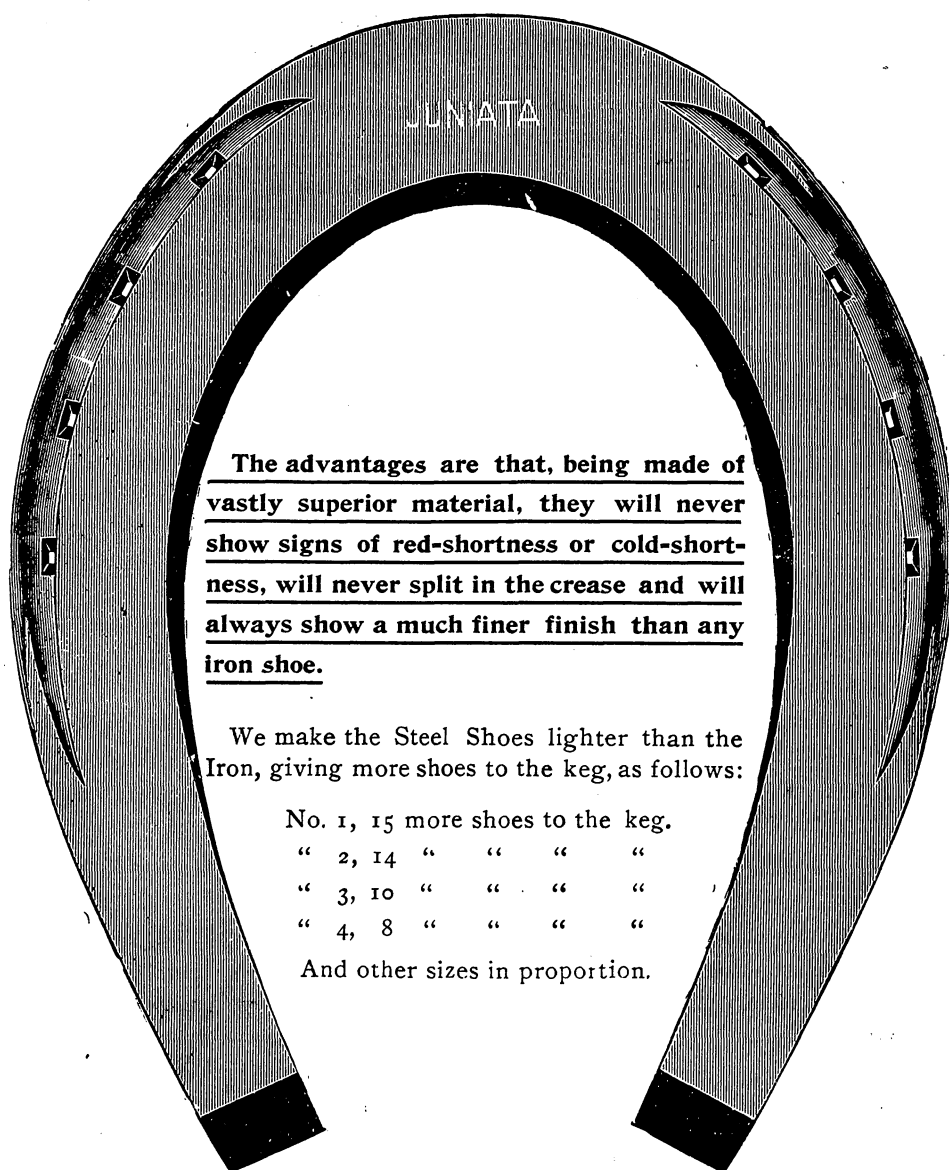
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The Practical Polish and Varnish Maker.
By H. C. STANAGE. A treatise containing 760 recipes and formulae for the manufacture of varnishes, polishes, &c. 12mo, cloth, \$2.50
For Sale by DAVID WILLIAMS, 96-102 Reade St., N. Y.

STEEL HORSE SHOES.

SHOENBERGER & CO., PITTSBURGH, PA.,

After numerous and costly experiments have succeeded in manufacturing a special quality of soft homogeneous steel, specially adapted to the manufacture of Horse and Mule Shoes, and are now making from this steel Extra Swaged, and Government Pattern Horse and Mule Shoes. They give the best of satisfaction everywhere and we furnish them to the trade at the same prices as the regular iron shoe sold by ourselves and our competitors. We are at present making our Roadster Pattern Horse Shoes out of Iron, but we will make them of Steel also within a short time.



The advantages are that, being made of vastly superior material, they will never show signs of red-shortness or cold-shortness, will never split in the crease and will always show a much finer finish than any iron shoe.

We make the Steel Shoes lighter than the Iron, giving more shoes to the keg, as follows:

No. 1, 15 more shoes to the keg.

" 2, 14 " " " "

" 3, 10 " " " "

" 4, 8 " " " "

And other sizes in proportion.

No. 2 EXTRA SWAGED FRONT.

We also beg to say that we have introduced improved machinery into our new factory and have doubled our capacity, and are now prepared to furnish the best shoe, either iron or steel, ever offered to the trade.

We would also call your attention to our Improved Steel Toe Calk, equal to any in the market. To secure the best wearing qualities use sand or borax in welding on a calk and cool off at a dark red, or still better, cool off without plunging in water. We make sizes numbers 1, 2, 3, 4, 5 and 6, packed in 25-pound boxes.

Write to us for information and prices, or apply to jobbers and dealers, who sell them everywhere.

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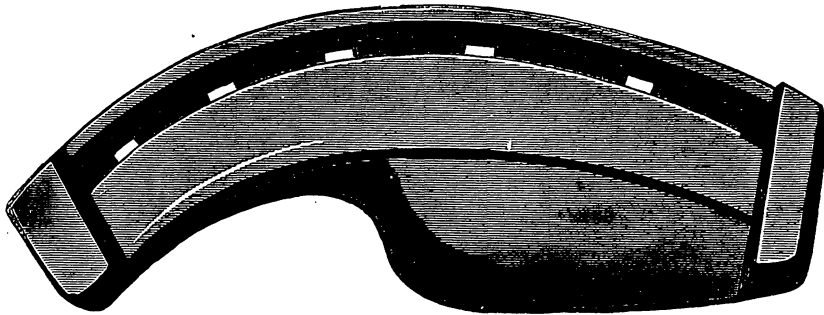
JUNIATA IRON AND STEEL WORKS, - - - PITTSBURGH, PA.

SCRANTON FORGING CO.,

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CARRIAGE HARDWARE AND SPECIAL DROP FORGINGS.

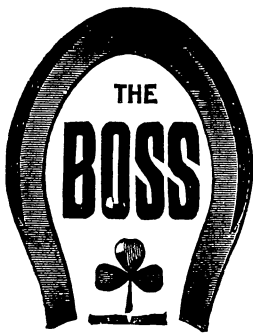
FORGED
OX
SHOES.



Made under Deebie's Patent, Aug. 9, 1887.

Our 1891 pattern is a modification of the style we have made for the past four years, giving additional strength to the web.

IT IS JUST RIGHT.



HORSE AND MULE SHOES.

Superior Quality, Shape and Finish.

BRYDEN HORSE SHOE CO.,

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RHODE ISLAND PERKINS HORSE SHOE CO.,

MANUFACTURERS OF

Horse and Mule Shoes of the Perkins Pattern.

SPECIALTIES:—X L Steel Shoes, Toe Weight Shoes and Goodenough Shoes.

Works at Valley Falls, R. I.

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J. C. McCARTY & CO., Agents - 97 Chambers Street, New York.

THE NEW DIAMOND STATE HORSE AND MULE SHOES.

JUST TRY THEM and YOU will say they excel all others.

MANUFACTURED BY

DIAMOND STATE IRON CO.

WILMINGTON, DELAWARE.

Other "high grade" specialties in Rivets, Spikes, Splice Bars, Track and Machine Bolts, Blaz Nuts, Stay Bolt Iron, Horse Shoe Iron, Bar Iron, &c.

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206 So. Fourth St.

{ Correspondence invited }

NEW YORK OFFICE,
11 Pine St



Covert Pants Stretcher.

THE Covert "Pants Stretcher" will restore the pantaloons to their original shape and length.

It removes all **WRINKLES** and **BAGGING AT THE KNEES**, giving them the appearance of having just left the tailor's hands.

It also holds the pants in a convenient position for brushing and cleaning.

The Stretcher cannot get out of order, and can be adjusted in the pants in a few seconds.

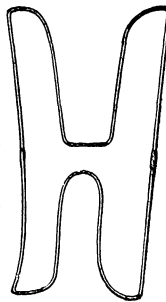
It being applied inside the pants, it obviates all objections prominent in other stretchers.

It is made of steel wire, and being in sections can be packed in a valise when traveling. Sold by the trade, or

Sample sent by mail to any address, free of postage, on receipt of \$1.00.

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HORSE SHOES.

"Burden Best"

Iron

Boiler Rivets.

The Burden Iron Co.

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HORSE SHOES.

PHOENIX HORSE SHOE CO.,

Poughkeepsie, N. Y.

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Standard Horse Shoe Co.,

Manufacturers of

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"The Best Driving Nail."

HIGHEST AWARD
—AT—
World's Columbian Exposition.

In the tests submitted before the judges on awards the Capewell No. 6 was shown to be 17 per cent. tougher than No. 8 of other makes.

"The Best Nail to Hold."

CAPEWELL HORSE NAILS,
MADE BY
THE CAPEWELL HORSE NAIL CO., - - - HARTFORD, CONN.

Office of D. C. BURNHAM,
Director of Works, World's Columbian Exposition,
JACKSON PARK, CHICAGO, ILL.

October 28, 1893.

To THE CAPEWELL HORSE NAIL CO.:
Gentlemen—I have used your horse nails here on the horses belonging to the World's Columbian Exposition, and I think they are far superior to any others that I have ever used. As I have been in the horseshoeing business for about twenty-five years, I know what I am talking about.

Very respectfully,
HERMAN J. HENKE,
Foreman Blacksmith, World's Columbian Exposition.

The Capewell Patent Corrugated Horse Nail.

Needs No Clinching.

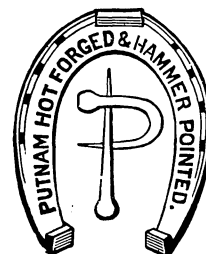
Highest Award

FOR

Supreme Excellence

TO

The PUTNAM Hot=Forged and Hammer=Pointed Horse NAILS,



At the *World's Columbian Exposition* at Chicago. A medal and diploma worded:
"Supreme excellence in material, method in manufacture, and quality of finished product; elasticity and smoothness combined with holding power in clinch. It allows the use of very small nails."

There is nothing beyond "supreme excellence," nor is there anything comprised in a horse nail, except the "material from which it is made," "the method of manufacture," and "quality of finished product." Putnam nails, by their "elasticity," give slightly to the expansion and contraction of the hoof while the horse is in motion; by their "smoothness," do not enlarge the nail holes in the hoof, while their "supreme excellence," in "holding power in the clinch," enables them to hold the shoe in the hardest service until worn out.

By the "use of small nails," large holes are avoided and money saved to the smith. Thus it will be seen that the officials of the *World's Columbian Exposition* recognize what qualities go to make up a good horse nail and that only the "Putnam" contains them all.

PUTNAM NAIL CO.,
Neponset, Boston, Mass.

H. D. SMITH & CO.,

Plantsville, Conn.,

MANUFACTURERS OF THE BEST QUALITY

CARRIAGE MAKERS' HARDWARE,

MANUFACTURE THE LARGEST VARIETY OF

FORGED CARRIAGE IRONS

Of Best Material and Workmanship.

Send for Price and Illustrated List of

CHAMPLAIN

Manufactured by the **NATIONAL HORSE NAIL CO.,**
VERGENNES, VERMONT.

All Sizes. All Patterns. All Warranted. Sold Everywhere.

J. C. McCARTY & CO., Agents, New York.



Elegant Iron.

Beautiful Shape.

HORSE SHOES,
Light, Medium and Heavy.
MULE SHOES,
Light, Medium and Heavy.

Illustrated booklet and prices to all parts of the world on application.

OLD DOMINION IRON AND NAIL WORKS CO.,

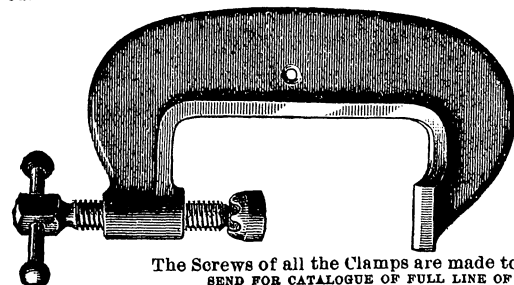
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Chicago Office, 45 La Salle St.

Richmond, Va., U. S. A

LE COUNT'S HEAVY STEEL CLAMP.

Extra heavy, with Button on end of screw, hung on a ball so as to accommodate itself to irregularities with out bending the screw. The foot of the Clamp is planed.



The Screws of all the Clamps are made to reach the lower number.

SEND FOR CATALOGUE OF FULL LINE OF MACHINISTS' TOOLS.

C. W. LE COUNT, MANUFACTURER, SO. NORWALK, CONN., U. S. A.


These goods are for sale by CHAS. CHURCHILL & CO., Ltd., 21 Cross St., London, England.

No. 1, opening to 2 inch.	.....	\$1 75
" 2, " " 3 " "	.....	2 00
" 3, " " 4 " "	.....	2 25
" 4, " " 5 " "	.....	2 50
" 5, " " 6 " "	.....	2 75
" 6, " " 8 " "	.....	3 25
" 7, " " 10 " "	.....	3 75
" 8, " " 12 " "	.....	4 25
" 9, " " 14 " "	.....	5 00
" 10, " " 16 " "	.....	6 00
" 11, " " 18 " "	.....	7 00
Full Set, 11 sizes,		\$40.50.

Ship or Bridge Clamp with Large Screws.

No. 12 opens 24 inches.....price, \$12 00

" 13 " 30 " " 16 00



P. F. BURKE, C. F. DEWICK & CO.
Manufacturer of
PATENT STEEL
(Blunt and Sharp)
TOE-CALKS.
—ALSO—
BURKE'S IMPROVED
HORSESHOERS'
FOOT VICE.
Send for Circulars.
360 Dorchester Av. Die for Welding
BOSTON, MASS. Sharp Calks.

Crescent
Horse and Mule Shoes,
BAR IRON.

CRESCENT HORSE SHOE
IRON CO.

Max Meadows, Va.



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Pat. Jan. 20, 1880.

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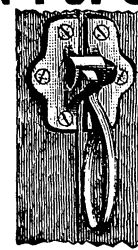
"CONROY"

Refrigerator Door

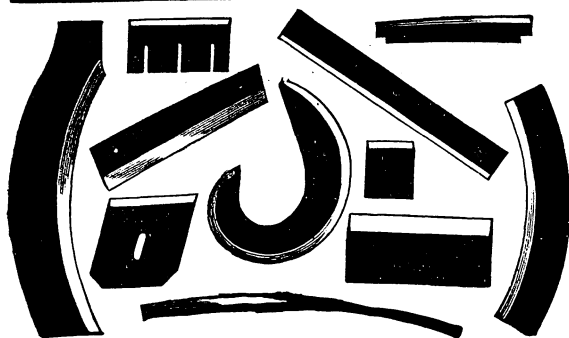
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Pat. Dec. 15 '85



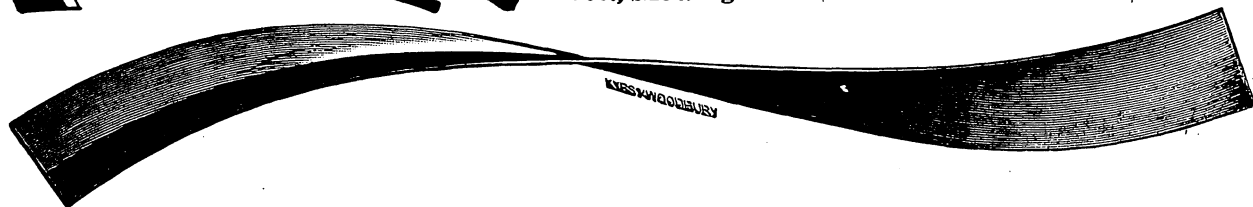
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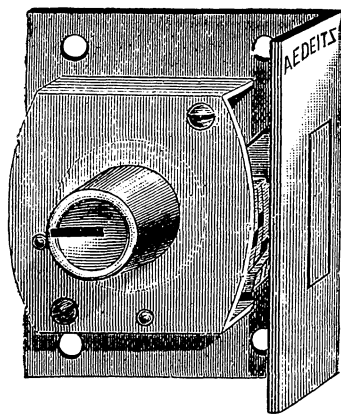
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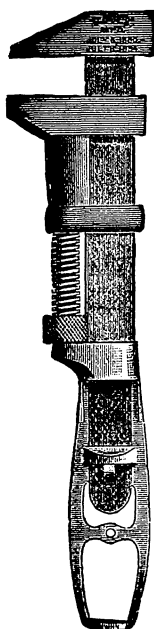
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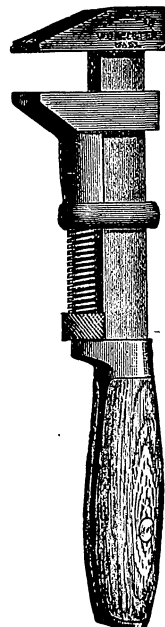
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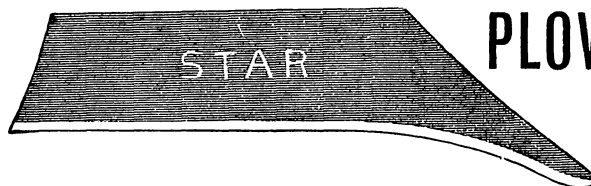
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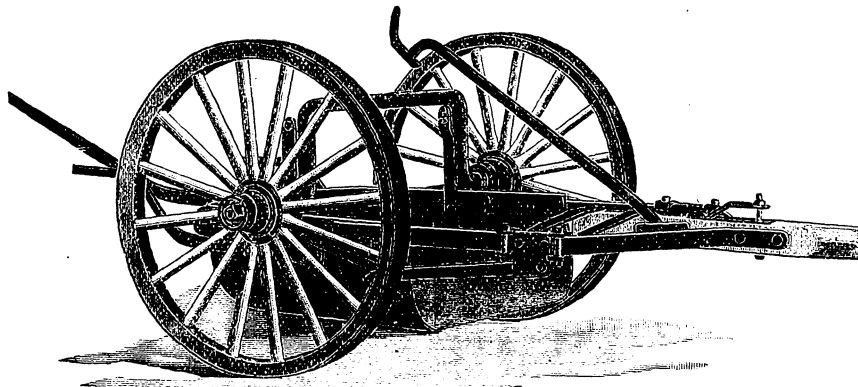
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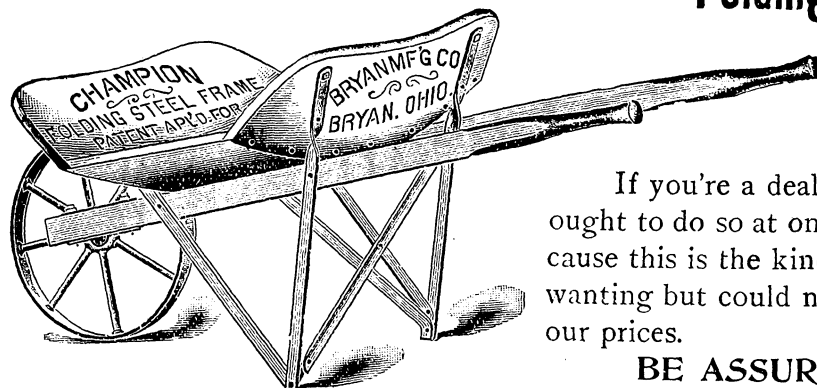
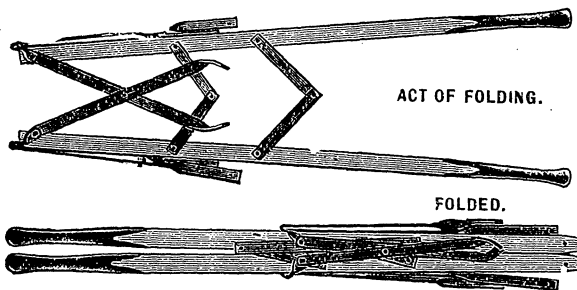


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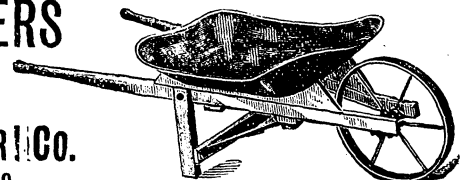
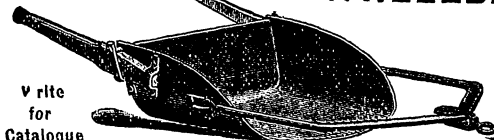
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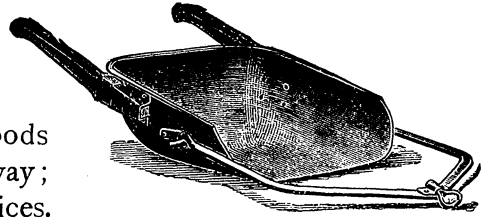
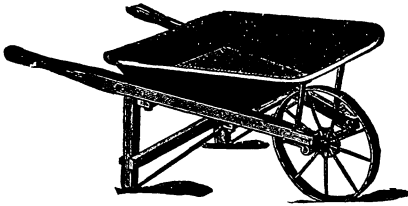
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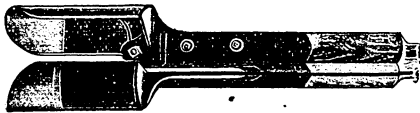
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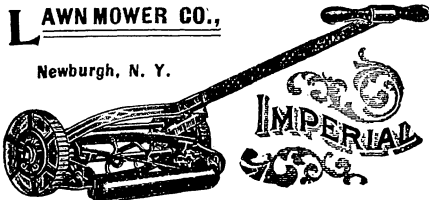
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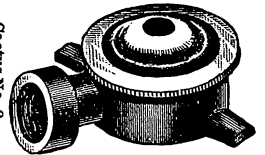
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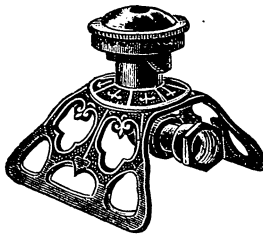
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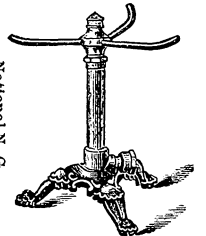
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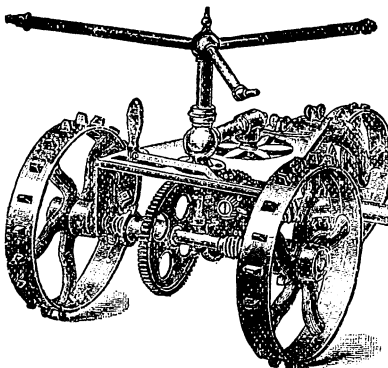
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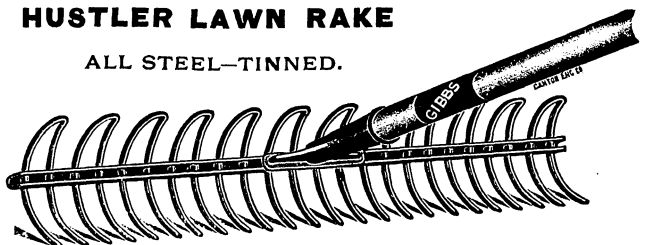
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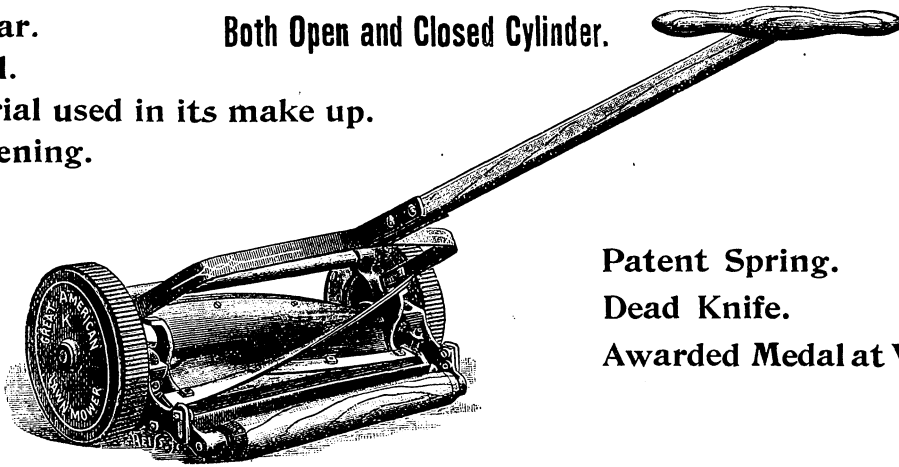
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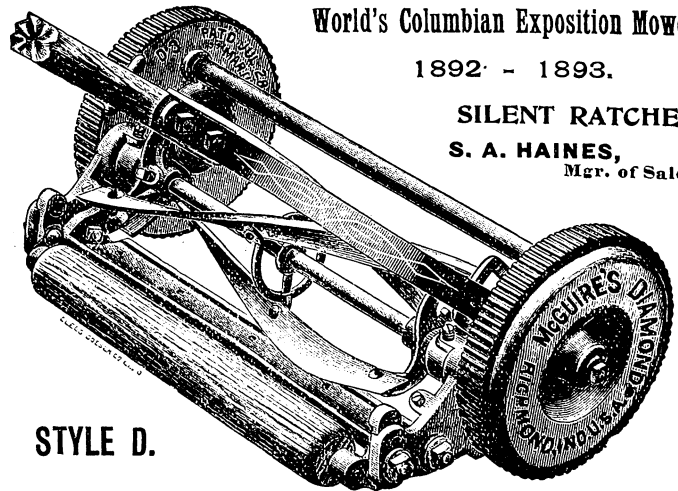
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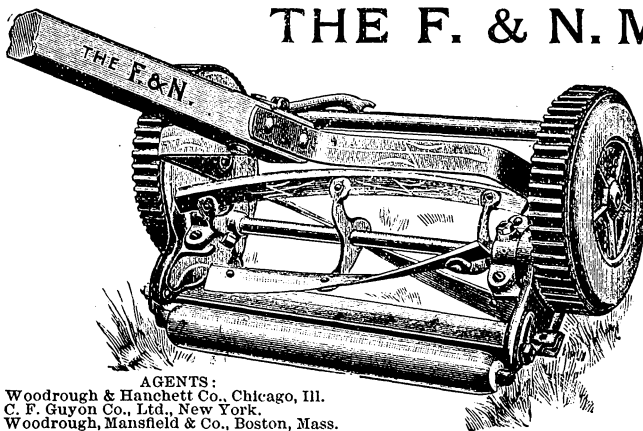
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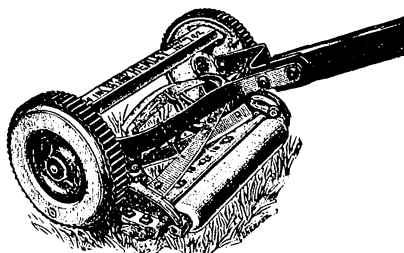
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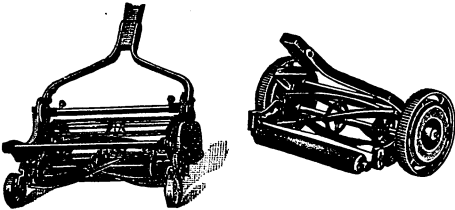
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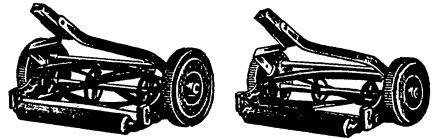


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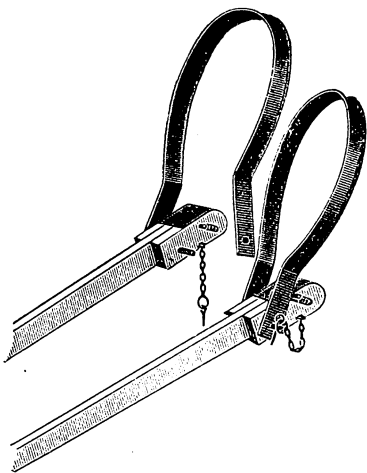
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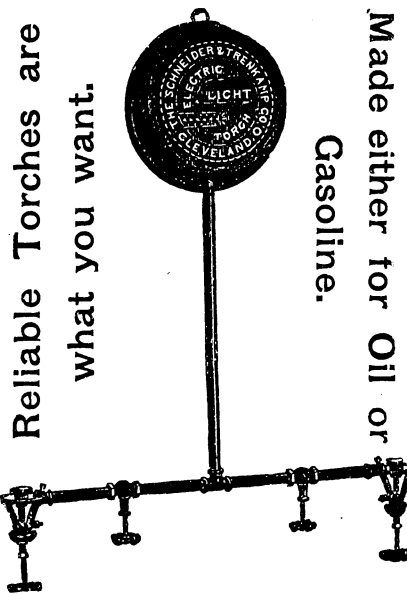
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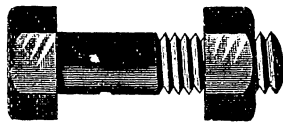
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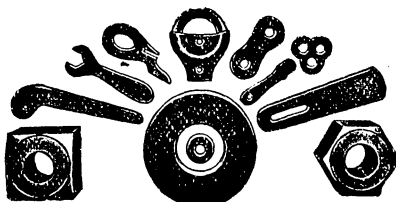
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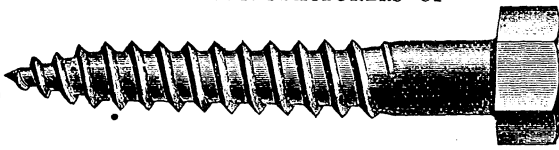
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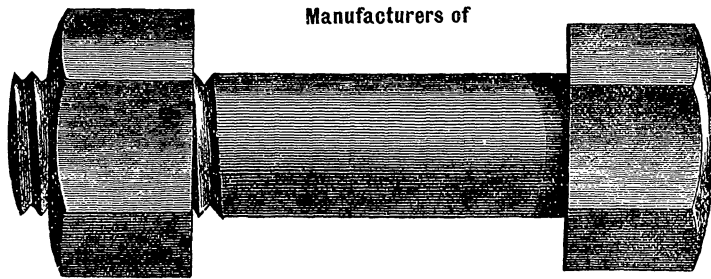
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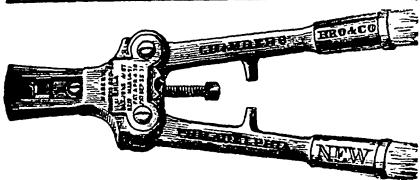
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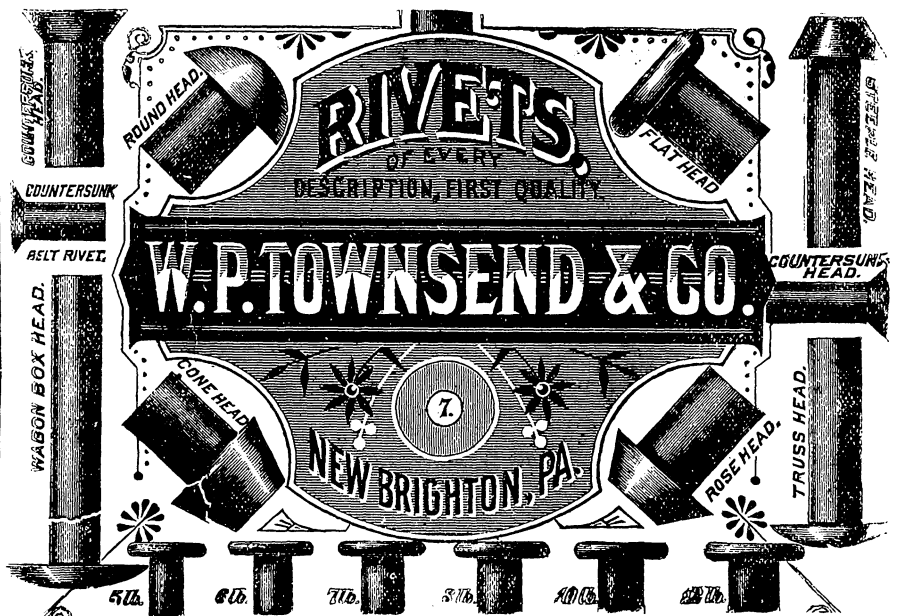
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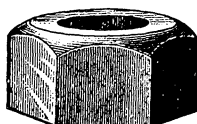
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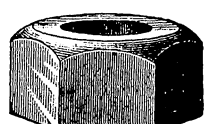
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Thomson, W. H. & Co., Phila., Pa.
Wallace, Wm. H. & Co., Albany & Washington streets, N. Y.
Whitney, A. R. & Co., 17 B'way, N. Y.
Wilson, E. H. & Co., Philadelphia, Pa.
- Iron, Importers.**
Abbott Wheelock & Co., N. Y. and Boston.
Lundberg, Gustaf, Boston, Mass.
- Iron, Sheet, Manufacturers of.**
Cambridge Iron & Steel Co., Cambridge, Ohio.
W. Dewees Wood Co., Lim., McKeesport, Pa.
- Iron Vases.**
Walbridge & Co., Buffalo, N. Y.
- Ironwork, Ornamental.**
Barnum, E. T., Detroit, Mich.
Champion Iron Co., Kenton, O.
Ludlow-Saylor Wire Co., St. Louis, Mo.
Mast, Foss & Co., Springfield, O.
The Van Dorn Iron Works Co., Cleveland, O.
- Keys.**
Wollensak, J. F., Chicago, Ill.
- Ladders, Rolling.**
Coburn Trolley Track Mfg. Co., Holyoke, Mass.
- Ladles.**
Detroit Fdy. Equipment Co., Detroit, Mich.
- Lamps.**
Plume & Atwood Mfg. Co., New York.
- Lamp Stoves.**
Glazier Stove Co., Chelsea, Mich.
Plume & Atwood Mfg. Co., 18 Murray Street, New York.
- Lanterns.**
Steam Gauge & Lantern Co., Syracuse, N. Y.
- Lathes.**
Draper Machine Tool Co., Worcester, Mass.
Johnson, Israel H., Jr., & Co., Philadelphia, Pa.
Seneca Falls Mfg. Co., Seneca Falls, N. Y.
- Lathing, Wire.**
Clinton Wire Cloth Co., Clinton, Mass.
N. J. Wire Cloth Co., Trenton, N. J.
Wright & Colton Wire Cloth Co., Worcester, Mass.
- Laundry Machines.**
Johnson, S. C., Racine, Wis.
- Lawn Mowers.**
Blair Mfg. Co., Springfield, Mass.
Chadborn & Coldwell Mfg. Co., Newburg, N. Y.
Coldwell Lawn Mower Co., Newburg, N. Y.
Dille & McGuire Mfg. Co., Richmond, Ind.
Enterprise Mfg. Co., Philadelphia, Pa.
F. & N. Mfg. Co., Richmond, Ind.
Henley, M. C., Richmond, Ind.
Mast, Foss & Co., Springfield, O.
Philadelphia Lawn Mower Co., Philadelphia, Pa.
Supplee Hdw. Co., Phila., Pa.
- Lawn Rakes.**
Gibbs Mfg. Co., Canton, Ohio.
Kohler, F. E. & Co., Canton, O.
- Lawn Sprinklers.**
Eite & Henger Mfg. Co., St. Louis, Mo.
Gibbs Mfg. Co., Canton, Ohio.
McGowan, John H. Co., Cincinnati, O.
Portland Lawn Sprinkler Co., Portland, Me.
- Lemon Squeezers.**
Ripley Mfg. Co., Unionville, Conn.
- Letters and Figures, Metallic.**
White, A. A. & Co., Providence, R. I.
- Letters, Paper.**
Tablet & Ticket Co., Chicago, Ill.
- Levels.**
Richardson, C. F. & Son Athol, Mass.
- Locks and Knobs, Manufacturers of.**
Leitz, A. E., 97 Chambers, N. Y.
Reading Hdw. Co., Reading, Pa.
Smith & Egge Mfg. Co., Bridgeport, Conn.
Yale & Towne Mfg. Co., Stamford, Conn.
- Lubricants.**
Dixon, Jos., Crucible Co., Jersey City, N. J.
- Machinery.**
Am. Tool Works, Cleveland, Ohio.
Barnes, W. F. & John, Rockford, Ill.
Sement, Miles & Co., Philadelphia, Pa.
Bigelow, C. E., 46 Dey, N. Y.
Bignall & Keeler Mfg. Co., St. Louis, Mo.
Bliss, E. W. Co., Brooklyn, N. Y.
Bridgeport Mch. Tool Works, Bridgeport, Conn.
Briggs, Marvin, 12 Broadway, N. Y.
Carlin's Sons, Thos., Allegheny, Pa.
Cinn. Milling Mch. Co., Cincinnati, Ohio.
Clapp, Geo. M., agt., 74 Cortlandt, N. Y.
Dietrich & Harvey Mch. Co., Baltimore, Md.
Fitchburg Mch. Works, Fitchburg, Mass.
Garvin Mch. Co., Lait & Canal Sts.
Gould & Eberhardt, Newark, N. J.
Hamilton Mch. Tool Co., Hamilton, O.
Harrington, E. Son & Co., Phila., Pa.
Henderer, A. L., Wilmington, Del.
Henger Machine Co., Torrington, Ct.
Hill, Clarke & Co., Boston, Mass.
Howard & Morse, 45 Fulton St., N. Y.
Hulbut-Rogers Mch. Co., South Sudbury, Mass.
Johnson, Israel H., Jr., & Co., Phila.
Jones & Lamson Mch. Co., Springfield, Vt.
Loggins & Co., Philadelphia, Pa.
McCabe, J. J., 68 Cortlandt, N. Y.
Machinists Supply Co., Rochester, N. Y.
Manville, E. J. Mch. Co., Waterbury, Conn.
Newark Mch. Tool Works, Newark, N. J.
New Haven Mfg. Co., New Haven, Conn.
Niles Tool Wks., 188 Liberty St., N. Y.
Pittsburgh Mfg. Co., Pittsburgh, Pa.

- Place, Geo.**, 120 Broadway, N. Y.
Poole, Robt. & Son Co., Baltimore, Md.
Powell Planer Co., Worcester, Mass.
Pratt & Whitney Co., Hartford, Conn.
Pratt's Tool & Supply Co., N. Y.
Scranton Supply & Mchry. Co., Scranton, Pa.
Sellers, Wm. & Co., Phila.
Seyfert's Sons L. F., Philadelphia, Pa.
Stephens, J. & Co., Cincinnati, O.
Stow Flexible Shaft Co., Ltd., Phila.
Toomey, Frank, Philadelphia, Pa.
Wetherill, Robert & Co., Chester, Pa.
Wickes Bros., Saginaw, Mich.
Wilson, W. A., Rochester, N. Y.
- Machinery for Hardware Manufacturers.**
Adt. Jno. & Son, New Haven, Conn.
- Machine Knives.**
Loring Coes & Co., Worcester, Mass.
- Machine Screws.**
New Britain Hdw. Mfg. Co., New Britain, Conn.
- Machine Tools.—See Machinery.**
- Machine Work.**
Papping, J., 68th St., & 11th Ave., N. Y. City.
- Machinists' Scales.**
Coffin & Leighton, Syracuse, N. Y.
Starrett, L. S., Athol, Mass.
- Machinists' Tools and Supplies.**
King, J. M. & Co., Waterford, N. Y.
Sellers, Wm. & Co., Inc., Phila.
- Mallets.**
N. Y. Mallet & Handle Works, N. Y.
- Mangles.**
Johnson, S. C., Racine, Wis.
- Measuring Tapes.**
Keuffel & Esser Co., New York.
Lufkin Rule Co., Saginaw, Mich.
- Mechanical Instruction.**
Correspondence School of Mechanics, Scranton, Pa.
- Metals.**
Fearing, Wm. S., 100 Chambers N. Y.
Hendricks Bros., 49 Cliff, N. Y.
- Metal Brokers.**
American Metal Co., N. Y.
- Metalurgists.**
Britton J. Blodgett, Phila., Pa.
- Milk Can Trimmings.**
Shepard, Sidney & Co., Buffalo, N. Y.
- Milling Machines.**
Clin. Milling Mch. Co., Cincinnati, Ohio.
- Mining Knives.**
Palmer Hdw. Mfg. Co., Troy, N. Y.
- Mine Lamps.**
Darby, Edw. & Sons, Phila., Pa.
Leonard, B. E., Scranton, Pa.
- Mining Screens.**
Harrington & King Perforating Co., Chicago, Ill.
Howard & Morse, 45 Fulton, N. Y.
- Models, Makers of.**
Franklin, H. H. Mfg. Co., Syracuse, N. Y.
Ideal Machine Works, Hartford, Conn.
Rhodes, L. E. Co., Hartford, Conn.
- Molding Sand.**
Obermayer, S. Co., Cincinnati, O.
- Motors, Water and Electric.**
C. & C. Electric Co., 402 and 404 Greenwich St., N. Y.
Dallett, Thos. H. & Co., Phila., Pa.
- Nail Machinery.**
Pittsburgh Mfg. Co., Pittsburgh, Pa.
- Nail Pullers.**
Scranton & Co., New Haven, Conn.
- Nails (Cut) and Spikes.**
Borden & Lovell, 70 West, N. Y.
Cumberland Nail & Iron Co., Phila.
Oxford Iron Co., 81 Washington, Pottstown Iron Co., Pottstown, Pa.
Riverside Iron Wks., Wheeling, W. Va.
- Norway Shapes, Rollers of.**
Rowland, William & Harve, Frankford, Philadelphia
- Novelty Manufacturers.**
Franklin, H. H. Mfg., Syracuse, N. Y.
Ideal Machine Works, Hartford, Conn.
- Nut Machines.**
Bonham Nut Co., Unionville, O.
- Nuts, Bolts, &c., Makers of.**
American Bolt Co., Lowell, Mass.
American Screw Co., Providence, R. I.
Blake & Johnson, Waterbury, Conn.
Dunham Nut Co., Unionville, Conn.
Hassell, Wm. H. Co., Pawtucket, Mass.
Mt. Carmel Bolt Co., Mt. Carmel, Conn.
Pennsylvania Bolt & Nut Co., Lebanon, Pa.
Port Chester Bolt and Nut Co., Port Chester, N. Y.
Russell, Burdall & Ward, Port Chester
Sternbergh, J. B. & Son, Reading, Pa.
Wilson, J. Fred, Worcester, Mass.
Wm. H. Haskell Co., Pawtucket, B. I.
- Oilers.**
Wilmot & Hobbs Mfg. Co., Bridgeport Conn.
- Oil Stones.**
Pike Mfg. Co., Pike Station, N. H.
- Oil Stoves.**
Glazier Stove Co., Chelsea, Mich.
- Ores.**
Wister, Francis, Philadelphia, Pa.
- Ox-Bow Pins.**
Sawyer, O. C., Sharon, Vt.
- Ox Shoes.**
Scranton Forging Co., Scranton, Pa.
- Packing.**
Morrison, Robert, St. Louis, Mo.
N. Y. Belting & Packing Co., Ltd., N. Y.
- Padlocks.**
Ames Sword Co., Chicopee, Mass.
Fram, E. T., Lancaster, Pa.
Hillebrand & Wolf, Phila., Pa.
- Paint Burners.**
Daugler Stove & Mfg. Co., Cleveland, O.
- Paint Cans.**
Wilmot & Hobbs Mfg. Co., Bridgeport, Conn.
- Pants Stretchers.**
Covert Mfg. Co., West Troy, N. Y.
- Patent Solicitors.**
Butler, C. N., Phila., Pa.
Mowson & Howson, Phila. & Washgton
Jenner, H. W. T., Washington, D. C.
Stocking, E. B., Washington, D. C.
- Perforated Metal.**
Clinton Wire Cloth Co., Clinton, Mass.
Harrington & King Perforating Co., Chicago, Ill.
Hendrick Mfg. Co., Ltd., Carbondale, Pa.
- Phosphor Bronze.**
Phosphor Bronze Smelting Co., Limited, Philadelphia.
- Phosphor Tin.**
Crescent Phosphorized Metal Co., Philadelphia, Pa.
Balk & Naumann, 416 Pearl, N. Y.
- Picks and Mattocks.**
Flumo, Fayette R., Philadelphia, Pa.
- Pig Iron.**
Houston, C. B. & Co., Philadelphia, Pa.
Montour Iron & Steel Co., Danville, Pa.
Jaylor & Co., 45 Wall, N. Y.
Phillips & Crane, Philadelphia, Pa.
Samuel, Frank, Philadelphia, Pa.
- Pig Iron Storage.**
Am. Pig Iron Storage Warrant Co., 44 Wall, N. Y.
- Pile Drivers.**
Voican Iron Wks., Chicago, Ill.
- Pipe, Bent.**
National Pipe Bending Co., New Haven
- Pipe Cutting and Threading Machines.**
Biggall & Keeler Mfg. Co., St. Louis, Mo.
Merrill Mfg. Co., Toledo, O.
Pancoat Henry B. & Co., Philadelphia.
Saunders's Sons, D., Yonkers, N. Y.
Walworth Mfg. Co., Boston, Mass.
- Pipe Grips.**
Prentiss Vise Co., 44 Barclay, N. Y.
- Pipes, Fittings, &c. Makers of.**
McNab & Harlin Mfg. Co., N. Y.
- Pipe, Water and Gas, Makers of.**
Cumberland Nail & Iron Co., Phila., Pa.
Nelson Iron Co., Emmaus, Pa.
Riverside Iron Works, Wheeling, W. Va.
Wood, R. D. & Co., Philadelphia, Pa.
- Plane Irons, Manufacturers of.**
Buck Bros., Millbury, Mass.
Buck, Chas., Millbury, Mass.
- Planes, Manufacturers of.**
Stanley Rule & Level Co., N. Y.
- Plated Ware.**
Boardman, L. & Son, New Haddam Ct
Holmes & Edwards Silver Co., Bridgeport, Conn.
Rogers, Wm. Mfg. Co., Hartford, Ct.
- Plate, Iron and Steel, Mfrs. of.**
Atna-Standard Iron & Steel Co., Bridgeport, O.
Lukens Iron & Steel Co., Coatesville, Pa.
Mahoning Valley Iron Co., Youngstown, Ohio.
Moorhead-McLean Co., Pittsburgh, Pa.
Milvain & Sons, Reading, Pa.
Pottstown Iron Co., Pottstown, Pa.
Pottsville Iron & Steel Co., Pottsville, Pa.
Singer, Nimick & Co., Pittsburgh, Pa.
The Mahoning Valley Iron Co., Youngstown, O.
Wellman Iron & Steel Co., Thurlow, Pa.
Wood Alan Co., Philadelphia.
- Plating, Nickel, Brass and Silver.**
Wilmot & Hobbs Mfg. Co., Bridgeport, Conn.
- Plow Shares.**
Star Mfg. Co., Carpentersville, Ill.
- Pokes.**
Bishop, A. W., Berea, Ohio.
- Polishing Machines.**
Watson & Sullivan, 204 E. 43d, N. Y.
- Post Hole Diggers.**
Buckeye Mfg. Co., Union City, Ind.
Gibbs Mfg. Co., Canton, Ohio.
Wister, L. & R. & Co., Philadelphia, Pa.
- Poultry Nettings.**
Barnum, E. T., Detroit, Mich.
Gilbert & Bennett Mfg. Co., 42 Cliff St., N. Y.
N. J. Wire Cloth Co., Trenton, N. J.
"Silver Finish."
Tyler Wire Wks. Co., W. S., Cleveland, O.
Wright & Colton Wire Cloth Co., Worcester, Mass.
- Powder.**
Lafin & Rand Powder Co., 29 Murray
New York Powder Co., 62 Liberty St., N. Y.
- Power Hack Saws.**
Millers Falls Co., 93 Reade St., N. Y.
- Power Hammers.**
Dienelt & Eisenhardt, Philadelphia.
Dupont Mfg. Co., St. Johnsbury, Vt.
Jenkins & Lingie, Bellefonte, Pa.
Long & Alstatter Co., Hamilton, Ohio
Scranton & Co., New Haven, Conn.
- Presses, Dies, &c.**
E. W. Bliss Co., Brooklyn, N. Y.
Crosby, G. A. & Co., Chicago, Ill.
Stark Mch. & Tool Co., Buffalo, N. Y.
Stiles & Parker Press Co., Brooklyn, N. Y.
Waterbury Mch. Co., Waterbury, Conn.
- Presses, Power, Makers of.**
Bliss, E. W. Co., Brooklyn, N. Y.
Manville, E. J. Mch. Co., Waterbury, Ct.
Merriman, A. H., Meriden.
Stark Mch. & Tool Co., Buffalo, N. Y.
Waterbury Farrel Foundry and Machine Co., Waterbury, Conn.
- Pruners.**
Topliff & Ely Co., Elyria, Ohio.
- Pulleys.**
Keystone Clutch Mch. Wks., Phila., Pa.
Lake, J. H. & D. Co., Massillon, Ohio.
- Pumping Machinery.**
Dean Bros. Steam Pump Works, Indianapolis, Ind.
Hoker-Colville Steam Pump Co., St. Louis, Mo.
McGowan, J. H. & Co., Cincinnati, O.
Maslin, J. & Son, Jersey City, N. J.
Norwalk Iron Wks. Co., So. Norwalk, Conn.
Southwark Fdy. & Mch. Co., Phila., Pa.
Valley Pump Wks., Easthampton, Mass.
Worthington, Henry R., 96 & 98 Liberty St., N. Y.
- Pumps, Makers of.**
Bellevue Pump Co., Bellevue, Iowa.
Deming Co., Salem, O.
Douglas, W. & B., Middletown, Conn.
Mast, Foss & Co., Springfield, O.
Myers, F. E. & Bro., Ashland, O.
- Punches.**
Richards, I. P., Providence, R. I.
- Punches and Shears, Hand and Power.**
E. W. Bliss Co., Brooklyn, N. Y.
Crosby, G. A. & Co., Chicago, Ill.
Crane & Speira Machine Co., Waterbury, Conn.
Henderer, A. L., Wilmington, Del.
Long & Alstatter Co., Hamilton, Ohio.
Stark Mch. & Tool Co., Buffalo, N. Y.
Stiles & Parker Press Co., Brooklyn, N. Y.
Waterbury Farrel Foundry and Mch. Co., Waterbury, Conn.
Watson & Stillman, 204 E. 43d, N. Y.
- Rails, Old and New.**
Perry, W. H. & Co., Providence, R. I.
- Rat and Mouse Traps.**
Estey, W. S., 65 Fulton, N. Y.
Ripley Mfg. Co., Unionville, Conn.
- Razors.**
J. A. Torrey Razor Co., Worcester, Mass.
- Reels.**
Hendryx, A. B. Co., New Haven, Conn.
- Refrigerator Door Fasteners.**
Conroy, P. J. & Co., Philadelphia.
- Refrigerators.**
Challenge Corn Planter Co., Grand Haven, Mich.
- Rivets.**
Blake & Johnson, Waterbury, Conn.
Boyes Rivet Co., Muncie, Ind.
Burden Iron Co., Troy, N. Y.
Clark & Cowles, Plainville, Conn.
Cobb & Drew, Plymouth, Mass.
Sternbergh, J. B. & Son, Reading, Pa.
Townsend, W. P. & Co., New Brighton, Pa.
- Riveting Machines.**
Adt. Jno. & Sons, New Haven, Conn.
- Rock Drills.**
Band Drill Co., 23 Park Place, N. Y.
- Rolling Mill Machinery.**
Birmingham Iron Fdry, Birmingham, Conn.
Booth, The Lloyd Co., Youngstown, C
Leachburg Foundry & Mch. Co., Pittsburgh, Pa.
Morgan Construction Co., Worcester, Mass.
Robinson-Shea Mfg. Co., Pittsburgh.
Totten & Hogg Iron and Steel Fdry Co, Pittsburgh, Pa.
Trethewey Mfg. Co., Pittsburgh, Pa.
Waterbury Farrel Foundry & Mch. Co., Waterbury, Conn.
- Rolls, Chilled, Sand and Steel.**
Birmingham Iron Foundry, Birmingham, Conn.
Booth, The Lloyd Co., Youngstown, Pa.
Garrison, A. Fdry. Co., Pittsburgh, Pa.
Robinson-Rea Mfg. Co., Pittsburgh, Pa.
Seaman, Slesch & Black, Pittsburgh.
Totten & Hogg Iron and Steel Fdry Co., Pittsburgh, Pa.
- Roofing.**
Cambridge Roofing Co., Cambridge, O.
Cincinnati Corrugating Co., Piqua, O.
Johns, H. W. Mfg. Co., 87 Maiden Lane.
Kanneberg Roofing Co., Canton, O.
N. Y. Iron Roofing & Corrugating Co., Jersey City, N. J.
- Rope and Web Goods.**
Covert Mfg. Co., West Troy, N. Y.
Covert's Saddlery Wks., Farmer, N. Y.
- Rope Wheels.**
Cresson, Geo. V. Co., Philadelphia, Pa.
- Rubber Goods.**
Canfield, H. O., Bridgeport, Conn.
- Rules, Manufacturers of**
Keuffel & Esser Co., New York.
Lufkin Rule Co., Saginaw, Mich.
Stanley Rule & Level Co., 29 Chambers
- Rust Preventive.**
Bridgeport Gun Implement Co., 313-315 Broadway, N. Y.
- Sand Paper.**
Baeder, Adamson & Co., Phila., Pa.
- Sash Balances.**
Caldwell Mfg. Co., Rochester, N. Y.
Fulman Sash Balance Co., Rochester, N. Y.
Stearns, E. C. & Co., Syracuse, N. Y.
- Sash Cords and Chains.**
Morton, Thos., 65 Elizabeth, N. Y.
Ossawa Mills Co., Norwich, Conn.
Samson Cordage Works, Boston, Mass.
Smith & Egge Mfg. Co., Bridgeport.
- Sash Locks.**
Ives, H. B. & Co., New Haven, Conn.
- Sash Pulleys.**
Palmer Hardware Mfg. Co., Troy, N. Y.
- Sash Weights.**
Brown, E. E. & Co., Philadelphia, Pa.
Norton Bros., Chicago, Ill.
- Saw Filing Machines.**
Disston, Henry & Sons, Philadelphia, Pa.
- Saws, Makers of.**
Disston, Henry & Sons, Phila., Pa.
National Saw Co., 96 Reade St., N. Y.
Simonds Mfg. Co., Fitchburg, Mass.
- Saw Vises.**
Seneca Falls Mfg. Co., Seneca Falls, N. Y.
- Saw Sets.**
Taintor Mfg. Co., 84-86 Chambers N. Y.
- Scales, Manufacturers of.**
Buffalo Scale Co., Buffalo, N. Y.
Chatillon, John & Sons, 85-88 Cliff, N. Y.
- Scrapers, Road.**
Am. Steel Scraper Co., Sidney, Ohio.
Kilbourne & Jacobs Mfg. Co., Columbus, O.
Sidney Steel Scraper Co., Sidney, O.
- Screens, Coal and Ore.**
Hendrick Mfg. Co., Ltd., Carbondale, Pa.
- Screening, Door and Window.**
White, Van Giahn & Co., 15-17 Chatham Sq., N. Y.
- Screw Cutting Machinery.**
Wells Bros. & Co., Greenfield, Mass.
Wiley & Russell Mfg. Co., Greenfield, Mass.
- Screw Drivers.**
Brown, R. H. & Co., New Haven, Conn.
Mayhew, A. H. Co., Shelburne Falls, Mass.
- Screw Plate and Pipe Cutter.**
Jarecki Mfg. Co., Erie, Pa.
- Screws, Makers of.**
American Screw Co., Providence, R. I.
Blake & Johnson, Waterbury, Conn.
Wm. H. Haskell Co., Pawtucket.
Miles, F. S., 205 Quarry, Philadelphia.
Reynolds & Co., New Haven, Conn.
Worcester Machine Screw Co., Worcester, Mass.
- Scroll Saws.**
Barnes, W. F. & John, Rockford, Ill.
Seneca Falls Mfg. Co., Seneca Falls, N. Y.
- Scythe Stones and Whetstones.**
Pike Mfg. Co., Pike Station, N. H.
Cleveland Stone Co., Cleveland, O.
- Shafting, Makers of.**
Cresson, Geo. V. Co., Philadelphia, Pa.
Fairmount Mch. Co., Philadelphia, Pa.
Fitzsimons & Co., Cleveland, Ohio.
Sellers, Wm. & Co., Inc. Phila.
Stow Co. Mfg., Fitchamton, N. Y.
- Shaped Iron and Steel, Manufacturers of.**
Atna-Standard Iron & Steel Co., Bridgeport, O.

Allentown Rolling Mill, Allentown, Pa.
Lockhart Iron & Steel Co., Pittsburg, Pa.
Pascale Rolling Mill Co., Paterson, N.J.
Pottsville Iron & Steel Co., Pottsville, Pa.
Robert, A. & P. & Co., Phila., Pa.
The Phoenix Iron Co., Phila., Pa.
Tudor Iron Works, St. Louis, Mo.

Shears and Scissors.

Asme Shear Co., Bridgeport, Conn.
Heinrichs, R. Sons Co., Newark, N. J.

Sheet Iron and Steel, Manufacturers of.

Atna-Standard Iron and Steel Co., Bridgeport, O.
Cambridge Iron & Steel Co., Cambridge, Ohio.
Chess Bros., Pittsburg, Pa.
Mahoning Valley Iron Co., Livingston, Ohio.
Morehead-McCleane Co., Pittsburg, Pa.
Peterson & Co., 29 Broadway, N. Y.
Singer, Nimick & Co., Ltd., Pittsburg, Pa.
The Mahoning Valley Iron Co., Youngstown, O.
Alan Wood Co., Philadelphia.
W. Dewees Wood Co., McKeesport, Pa.

Sheet Zinc.

Mathlessen & Hegeler Zinc Co., La Salle, Ill.

Sinks.

Douglas, W. & B., Middletown, Conn.

Skates, Ice.

Lovell, Jno. P. Arms Co., Boston, Mass.
Winslow, Sam'l, Skate Mfg. Co., Worcester, Mass.

Skates, Roller.

Denley, M. O., Richmond, Ind.
Winslow, Sam'l, Skate Mfg. Co., Worcester, Mass.

Smelting Works.

Deeves, Paul S., 760 S. Broad, Phila.

Soldering Coppers.

Clendenin Bros., Baltimore, Md.
Covert Mfg. Co., West Troy, N. Y.

Speaking Tubes.

Strander, W. R. & Co., 204 Fulton St., N. Y.
Wollensak, J. F., Chicago, Ill.

Specialties, Pat. Articles.

Rhodes, L. E. Co., Hartford, Conn.

Spelter.

Mathlessen & Hegeler Zinc Co., La Salle, Ill.
Missouri Metal Co., St. Louis, Mo.

Spoons and Forks.

Swordman, L. & Son, New Haddam, Conn.
Holmes & Edwards Silver Co., Bridgeport, Conn.
Bogers, The Wm. Mfg. Co., Hartford, Conn.

Sporting Goods.

Dartley & Graham, 313-315 B'way, N.Y.

Spring.

Clark & Cowles, Plainville, Ct.
Dundar Bros., Bristol, Conn.
Miller & Van Winkle, Brooklyn, N. Y.
Morgan Spring Co., Worcester, Mass.
Boland, Wm. & Harvey, Phila., Pa.
Sabin Machine Co., Montpelier, Vt.
Tuck Mfg. Co., Brockton, Mass.
Washburn & Moen Mfg. Co., Worcester, Mass.
Wolff, R. H. & Co., Ltd., 118th St. and Harlem River, N. Y.

Spring Hinges.

Pullman Sash Balance Co., Rochester, N. Y.
Stover Mfg. Co., Freeport, Ill.
Van Wagoner & Williams Co., 14 Warren St., N. Y.

Stamped Ware.

Am. Stamping Co., 104 & 106 John St., New York

Stamping Works.

Cleveland Stamping & Tool Co., Cleveland, O.

Staples.

Cobb & Drew, Plymouth, Mass.
Titchener E. H. & Co. Binghamton N.Y.

Steam Gauges.

Aristol Co., Waterbury, Conn.

Steam Hammers, &c., Makers of.

Jennett & Eisenhardt, Philadelphia.
Dudgeon, Richard, 24 Columbia Street, N. Y.
Trethewey Mfg. Co., Pittsburg, Pa.

Steam Heating.

Webster Warren & Co., Camden, N.J.

Steam Separators.

Covert Mfg. Co., 32 Cortland St., N. Y.
Harrison Safety Boiler Wks. Phila. Pa.

Steel, Cold Rolled Strip.

Superior Steel Co., Pittsburg, Pa.
Wilmot & Hobbs Mfg. Co., Bridgeport, Conn.

Steel Figures and Alphabets.

Hoggson & Pettis Mfg. Co., New Haven, Conn.
Krogerud, W., 61 Fulton N. Y.

Steel Importers.

Abbott, Wheelock & Co., N. Y. and Boston.
Hobson, Francis, Seaman & Co., 97 John St., N. Y.
Jessop, Wm. & Sons, Sheffield, Eng. land, or 91 John N. Y.
Milne, A. & Co., 1 Broadway, N. Y.
Newton & Shipman, 83 John, N. Y.
Wetherell Bros., 93 Liberty St., N. Y.
Whitney, A. R. & Co., B'dway, N. Y.
Wolff, R. H. & Co., Ltd., 118th Street and Harlem River, N. Y.

Steel (Musher's Special).

Jones, B. M. & Co., Boston.

Steel Manufacturers.

Atna-Standard Iron & Steel Co., Bridgeport, O.
Bethlehem Iron Co., S. Bethlehem, Pa.
Baker, Herman & Co., 103 Duane St. Carbon Steel Co., Pittsburg, Pa.
Chester Steel Castings Co., Phila., Pa.
Chrome Steel Works, Brooklyn, N. Y.
Crescent Steel Co., Pittsburg, Pa.
Frankford Steel Co., Philadelphia.
Gautier Steel Department or Cambria Iron Co., Johnstown, Pa.
Hobson, Francis, Seaman & Co., 97 John St., N. Y.
Jessop, Wm. & Sons, Sheffield, Eng. land, or 91 John N. Y.
Kayser, Ellison & Co., Sheffield, Eng. La Belle Steel Co., Pittsburg, Pa.
Lukens Iron & Steel Co., Coatesville, Pa.
Morehead-McCleane Co., Pittsburg, Pa.
Moss, F. W., 85 John N. Y.
Pottsville Iron and Steel Co., Pottsville, Pa.
Rowland, Wm. & Harvey, Frankford, Pa.
Singer, Nimick & Co., Pittsburg, Pa.
Steel & Iron Improvement Co., Pittsburgh, Pa.
Superior Steel Co., Pittsburg, Pa.
Wordlaw, S. & C., Sheffield, Eng.
Wetherell Bros., 93 Liberty, N. Y.
Wilmot & Hobbs Mfg. Co., Bridgeport, Conn.

Steel, Manufacturers' Agents.

Barnes, C. K. & Co., Philadelphia, Pa.
Corning, Edw. & Co., 29 B'way, N. Y.
Lindsay, Jas. G. & Co., Phila., Pa.
Peterson & Co., 29 Broadway, N. Y.

Steel Rails, Manufacturers of.

Bethlehem Iron Co., S. Bethlehem, Pa.
Cambria Iron Co., Johnstown, Pa.
Montour Iron & Steel Co., Danville, Pa.
Riverside Iron Wks., Wheeling, W. Va.

Steel, Tool.

Frankford Steel Co., Philadelphia, Pa.
Jessop, Wm. & Sons, Sheffield, Eng. land, or 91 John N. Y.
Hart, Mfg. Co., Cleveland, O.
Jones, B. M. & Co., Boston, Mass.
La Belle Steel Co., Pittsburg, Pa.

Step Ladders.

Cycle Step Ladder Co., Chicago, Ill.
Croissant, M., Albany, N. Y.

Stocks and Dies.

Armstrong Mfg. Co., Bridgeport, Conn.
Billings & Spencer Co., Hartford, Conn.
Butterfield & Co., Derby Line, Vt.
Hart Mfg. Co., Cleveland, O.
Saunders' Sons, D., Yonkers, N. Y.
Wells Bros. & Co., Greenfield, Mass.
Wiley & Russell Mfg. Co., Greenfield, Mass.

Stove Linings.

Ostrander Fire Brick Co., Troy, N. Y.

Stove Pipe Thimbles.

Cheney, S. & Son Manlius, N. Y.

Street Lamps.

Steam Gauge & Lantern Co., Syracuse, N. Y.

Strops.

J. R. Torrey & Co., Worcester, Mass.

Structural Iron Work.

Lindsay, Jas. G., & Co., Phila., Pa.

Sulphuric Acid.

Mathlessen & Hegeler Zinc Co., La Salle, Ill.

Tacks, Brads, Staples, &c.

Atlas Tack Corporation, Boston, Mass.
Clendenin Bros., Baltimore, Md.
Cobb & Drew, Plymouth, Mass.
Grand Crossing Tack Co., Grand Crossing, Ill.
Jennett & Eisenhardt, Philadelphia.
Carpenter, J. M., Tap & Die Co., Pawtucket, R. I.
Manning, Maxwell & Moore, 111 Liberty, St., N. Y.
Wells Bros. & Co., Greenfield, Mass.
Wiley & Russell Mfg. Co., Greenfield, Mass.

Testing Laboratories.

Nichols Bros. Testing Mch. Co., Philadelphia.

Testing Machines.

Nichols Bros. Testing Mch. Co., Phila.

Theatrical Hardware.

Wollensak, J. F., Chicago, Ill.

Thill Springs.

Frost Thill Spring Co., Boston, Mass.
Sabin Machine Co., Montpelier, Vt.

Timber and Mineral Lands.

Robertson, E. Co., Cincinnati, O.

Time Record.

Scattergood, H. W., Phila., Pa.

Tinning Process.

Sands, Thomas, Nashua, N. H.

Tin Plate Machinery.

Lloyd Booth Co., Youngtown, Ohio.

Tinware.

Am. Stamping Co., 104 & 106 John St.,

Tire Upsetters.

Butts & Ordway, Boston, Mass.

Toe Calks, Steel.

Burke, P. F., Boston, Mass.

Tool Blocks.

Hulbut-Rogers Mch. Co., South Sudbury, Mass.

Tool Chests.

Am. Tool Co., 200 W. Houston St., N.Y.

Tool Holders.

Armstrong Bros. Tool Co., Chicago, Ill.

Tools.

Brown, R. H. & Co., New Haven, Conn.
Fraser Co., 19 Warren St., New York.
Hurley Bros., Hartford, Conn.
Mayhew, A. R. Co., Snelburne Falls, Mass.
Miers Falls Co., 93 Reade, N. Y.
Richardson, C. F. & Son, Athol, Mass.
Stanley Rule & Level Co., 29 Chambers, New York.
Starratt, L. S., Athol, Mass.
Wilkinson, A. J. & Co., Boston, Mass.

Tools, Blacksmith and Wheelwrights.

Buffalo Forge Co., Buffalo, N. Y.
Butts & Ordway Boston, Mass.
Champion Blower & Forge Co., Lancaster, Pa.
Plumb, Fayette R., Philadelphia, Pa.
Wiley & Russell Mfg. Co., Greenfield, Mass.

Tools, Steam and Gas Fitters.

Saunders' Sons, D., Yonkers, N. Y.

Torches, Oil and Gasoline.

Dangler Stove & Mfg. Co., Cleveland, O.
Schneider & Trenkamp Co., Cleveland, Ohio.

Transom Lifters.

Wollensak, J. F. Chicago, Ill.

Tricycles.

Toledo Metal Wheel Co., Toledo, Ohio.

Trucks, Manufacturers of.

Clark, G. P., Windsor Locks, Conn.
Lansing Wheelbarrow Co., Lansing, Mich.

Tubes, Seamless Drawn Copper.

Ansonia Brass & Copper Co., 19 and 21 Cliff, N. Y.
Randolph & Clowes, Waterbury, Conn.

Tubes, Steel.

Ellwood Shafting & Tube Co., Ellwood City, Pa.
Long's John S. Son & Co., 4 Fletcher St., New York.
U. S. Projectile Co., Brooklyn, N. Y.

Tumbling Barrels.

Henderson Bros., Waterbury, Conn.

Turnbuckles.

Cleveland City Forge & Iron Co., Cleveland, O.
Merrill Bros., Brooklyn, E. D.

Twist Drills, Makers of.

Cleveland Twist Drill Co., Cleveland.
Morse Twist Drill & Machine Co., New Bedford, Mass.
New Process Twist Drill Co., Taunton, Mass.
Standard Tool Co., Cleveland.

Valves, Gas, Water and Steam.

Best, Fox & Co., Pittsburg, Pa.
Chapman Valve Mfg. Co., Boston.
Eynon-Evans Mfg. Co., Philadelphia, Pa.
Jenkins Bros., 71 John, N. Y.
Lunkheimer Co., Cincinnati, O.
McNab & Harlin Mfg. Co., 56 John N. Y.

Ventilator Appliances.

Howard & Morse, 45 Fulton, N. Y.

Vise Jaws.

Newark Mch. Tool Co., Newark, N. J.

Vises.

Athol Machine Co., Athol, Mass.
Hollands Mfg. Co., Erie, Pa.
Howard Iron Works, Buffalo, N. Y.
Millers Falls Co., 93 Reade St., N. Y.
Prentiss Vise Co., 44 Barclay N. Y. Y.
Van Wagoner & Williams Co., Warren St., N. Y.

Wagon Jacks.

Covert Mfg. Co., West Troy, N. Y.
Covert's Saddlery Works, Farmer, N. Y.

Washers.

Haskell, Wm. H. Co., Pawtucket, R. I.
Milton Mfg. Co., Milton, Pa.
Sternbergh, J. H. & Son, Reading, Pa.

Washing Machines.

Richmond Cedar Works, Richmond, Va.

Water Meters.

Worthington, Henry R., 86 & 88 Liberty St., N. Y.

Water Wheels.

Poole, Robt. & Son Co., Baltimore, Md.

Well Buckets.

Richmond Cedar Works, Richmond, Va.

Wheelbarrows.

Amer. Steel Scraper Co., Sidney, Ohio.
Byram Mfg. Co., Byram, Ohio.
Kilbourne & Jacobs Mfg. Co., Columbus, Ohio.
Lansing Wheelbarrow Co., Lansing, Mich.
Sidney Steel Scraper Co., Sidney, O.

Window Cord, Makers of.

Samson Cordage Works, Boston, Mass.

Wire, Manufacturers of.

Gautier Steel Department of Cambria Iron Co., Johnstown, Pa.
Miller & Van Winkle, Brooklyn, N. Y.
New Castle Wire Nail Co., New Castle, Pa.
New Haven Wire Mfg. Co., New Haven, Conn.
Prentiss, Geo. W. & Co., Holyoke, Mass.
Salem Wire Nail Co., Salem, O.
Trenton Iron Co., Trenton, N. J.
Washburn & Moen Mfg. Co., Worcester.
Wetherell Bros., 93 Liberty St., F. Y.
Wolff, R. H. & Co., Ltd., 118th St. and Harlem River, N. Y.
Wright & Colton Wire Cloth Co., Worcester, Mass.

Wire Cloth.

Barnum, E. T., Detroit, Mich.
Clinton Wire Cloth Co., Clinton, Mass.
Darby, Edward & Sons, Philadelphia.
Estey, W. S., 65 Fulton, N. Y.
Gilbert & Bennett Mfg. Co., 42 Cliff.
Howard & Morse, 45 Fulton, N. Y.
N. J. Wire Cloth Co., Trenton, N. J.
Scheeler & Sons, Buffalo, N. Y.
Wickwire Bros., Cortland, N. Y.
Wright & Colton Wire Cloth Co., Worcester, Mass.
W. S. Tyler Wire Works Co., Cleveland.

Wire Cutters.

King, J. M. & Co., Watertown, N. Y.

Wire Dies.

McFarland, Wm., Trenton, N. J.
Newton & Shipman, 83 John, N. Y.

Wire Fences, See Fencing, Iron and Wire.

Wire Goods, Manufacturers of.

Bromwell Brush & Wire Goods Co., Cincinnati, O.
Darby, Edward & Sons, Phila.
Gilbert & Bennett Mfg. Co., 42 Cliff, N. Y.
Ludlow-Saylor Wire Co., St. Louis.
Ossawan Mills Co., Norwich, Conn.
Scheeler & Sons, Buffalo, N. Y.
Wickwire Bros., Cortland, N. Y.
Williamson, C. F. Wire Novelty Co., Newark, N. J.

Wire Machinery.

Am. Tool Wks., Cleveland, O.
Manville, E. J. Mch. Co., Waterbury, Ct.
Morgan Construction Co., Worcester, Mass.
Waterbury Mch. Co., Waterbury, Conn.

Wire Straightening and Cutting Machinery.

Adt, John & Son, New Haven, Conn.

Wire Nails.

Bond Nail Co., Raynham, Mass.
Indiana Wire Fence Co., Crawfordsville, Ind.
Kilmer Mfg. Co., Newburg, N. Y.
New Castle Wire Nail Co., New Castle, Pa.
Phillips, Townsend & Co., Phila., Pa.
Salem Wire Nail Co., Salem, O.
Taunton Wire Nail Co., Taunton, Mass.
Whitney, A. R. & Co., New York, N. Y.

Wire Ropes, Iron and Steel, Makers.

Broderick & Bascom Rope Co., St. Louis, Mo.
California Wire Works, San Francisco.
Hasard Mfg. Co., Wilkesbarre, Pa.
A. Leschen & Sons Rope Co., St. Louis.
Trenton Iron Co., Trenton, N. J.
Washburn & Moen Mfg. Co., Worcester, Mass.
Williamsport Wire Rope Co., Williamsport, Pa.

Wood-Working Machinery.

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McGowan, J. H. & Co.....	31	Peerless Mfg Co.....	60	Sidney Steel Scraper Co.....	84	Watson & Stillman.....	37
McIlvain, Wm. & Sons.....	25	Pennsylvania Bolt & Nut Co.....	87	Sigourney Tool Co.....	38	Webster, Warren & Co.....	28
McKay, Jas. & Co.....	15	Penna. Diamond Drill & Mfg. Co.....	24	"Silver Finish".....	5	Wellman Iron & Steel Co.....	14
McKinney Mfg. Co.....	74	Pennsylvania Mch. Co.....	46	Silver Mfg. Co.....	36	Wells Bros. & Co.....	40
McLean, John.....	26	Perry, W. H. & Co.....	46	Simonds Mfg. Co.....	58	Western Foundry Co.....	23
McLeod & Henry Co.....	23	Perry & Whipple Co.....	76	Singer, Nimick & Co.....	19	Wetherell Bros.....	16 & 19
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		Roberts Mfg. Co.....	32				

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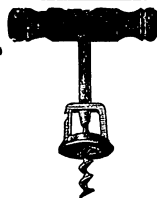
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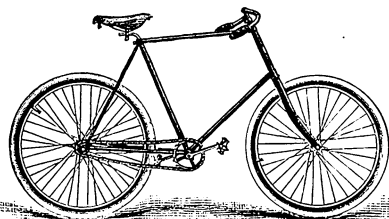
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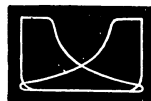
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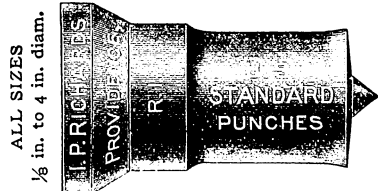
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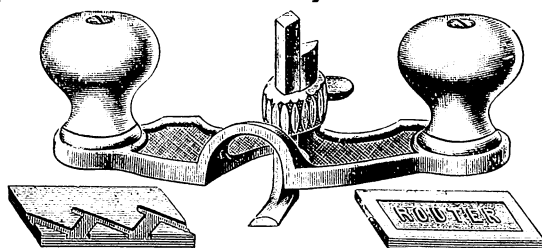
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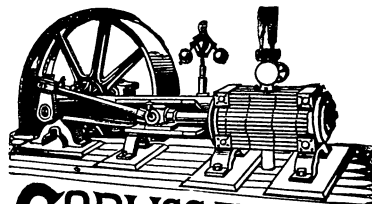
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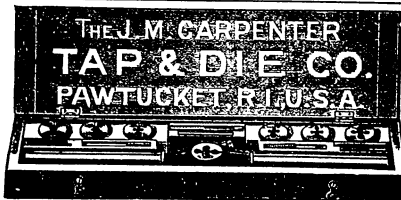
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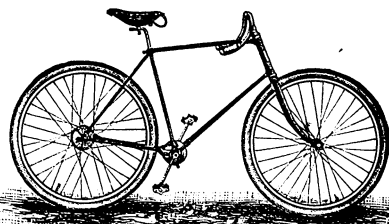
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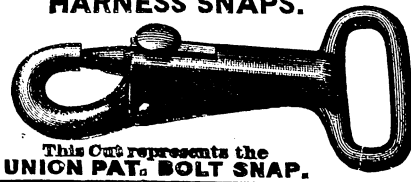
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THE IRON AGE

THURSDAY, MARCH 22, 1894.

Oil Fuel in Ocean Steamers.

The subject of the utilization of oil as fuel in ocean steamships, in place of coal, has received considerable attention of late years. Its advantages in respect of perfect combustion, absence of dirt and ashes, economy in expenditure and saving in weight of fuel to be carried have lately received practical demonstration in the case of the British steamship "Baku-Standard," which arrived at Philadelphia last month. This vessel made the trip across from Dartmouth, England, using exclusively petroleum residuum as fuel. The voyage was an especially trying one, the ship having been caught in Arctic drift ice, and detained so long that the passage occupied 26 days. The experiment was, however, regarded as an unqualified success. According to a report given to the Philadelphia *Record*, the consumption was about 20 tons of the fuel every 24 hours, while in the same time 30 tons of bituminous coal are consumed. On this run the residuum was from Russian oil, but on the outward trip Pennsylvania oil fuel will be used. Another important advantage besides economy in fuel was found in the necessity for fewer fire men and stokers, 12 men less than before making up the "Baku-Standard's" engine room complement. In the stoke hold there were but four men needed, two boiler tenders and two greasers. The "Baku-Standard" was built for the oil trade by Sir William Armstrong for A. Sult of London, a large owner of this class of shipping. She registers 3705 gross tonnage, is 330 feet long, 43 feet beam and 23 feet depth of hold. She carries over 1,200,000 gallons of petroleum in bulk, and trades to Russia and the United States.

A 50-year contract has been given by the State of New York to the Cataract General Electric Company of Niagara

Falls, to operate an electric plant along the lines of the State canals by which boats may be propelled by trolley or other system.

It is proposed to hold an international exhibition in Hobart, Australia, during the summer of 1894-5 under the official

The Cowper-Coles Cold Galvanizing Process.

The electro deposition of zinc has been the subject of many patents, but the process was found to be too slow and costly, and the deposit obtained porous. Mr. Cowper-Coles claims that his method

of deposition entirely overcomes these difficulties. The engravings, which are from the *Engineer* of London, show the arrangement of a plant recently erected by Watson, Laidlaw & Co., at Glasgow. The articles to be zincked, if thickly coated with grease, are passed through the "potash boil," which is kept at a temperature of about 200° F. by means of a copper steam coil, the solution consisting of 1 pound of American potash to the gallon of water. The articles are then placed in the pickling tank, which contains a weak solution of sulphuric acid and water, kept circulating by a steam jacketed pipe outside the tank, as shown on the plan. The articles are then placed in the washing tank and allowed to remain there until they are required for zincking.

Figs. 3 to 6 illustrate the arrangements of the anode and cathode suspension bars, which are designed to carry 800 amperes each, the total output of the dynamo being 2500 at 5 volts. A current density of 50 amperes per square foot is employed at the electrodes. The current is conveyed from the dynamo to the zincking bath by two cotton covered cables, having a total sectional area of 2½ inches. Each cable contains 16,800 No. 33 S.W.G. wires made up into 20 strands. The cathodes—that is, the articles being zincked—are suspended on compound copper and steel suspension bars, which rest on a rocking frame to which is imparted a horizontal and vertical motion by means of a hand lever and roller paths, as shown below; the roller paths have a rise of 1 inch in 3 inches. The structure of the compound conductor suspending bars is shown clearly in Figs.

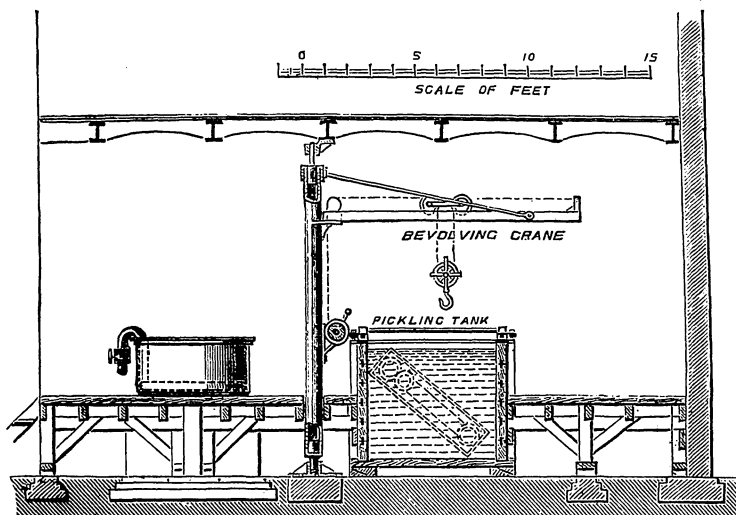


Fig. 1.—Vertical Section of Electro Galvanizing Works.

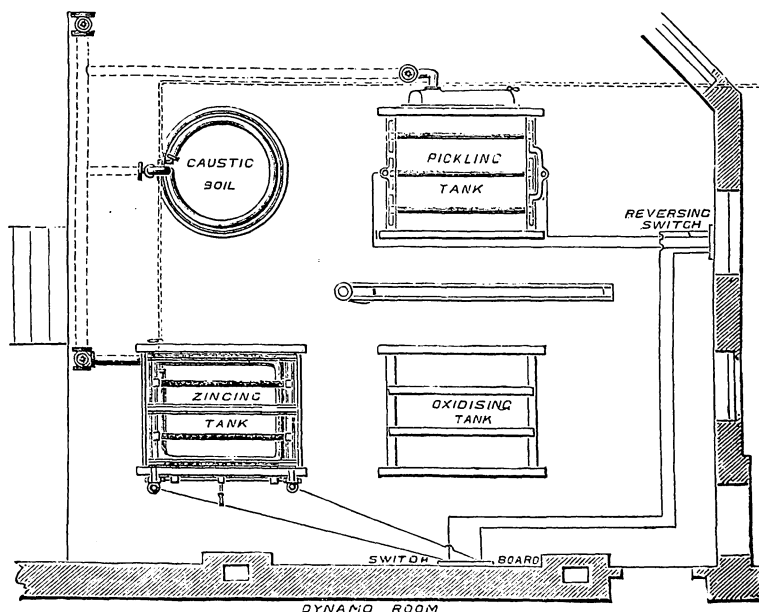


Fig. 2.—Plan of Electro Galvanizing Works.

THE COWPER-COLES COLD GALVANIZING PROCESS.

patronage of the Government of Tasmania. The claim is made that no Australian city could afford exhibitors greater facilities for bringing their products and manufactures under the notice of the people of Australasia, who annually import about \$300,000,000 of merchandise and export product to an equal value. Applications for space may be made to the secretary of the London Committee, Tasmania Government office, 5 Victoria street, London, S. W., England.

area of 2½ inches. Each cable contains 16,800 No. 33 S.W.G. wires made up into 20 strands. The cathodes—that is, the articles being zincked—are suspended on compound copper and steel suspension bars, which rest on a rocking frame to which is imparted a horizontal and vertical motion by means of a hand lever and roller paths, as shown below; the roller paths have a rise of 1 inch in 3 inches. The structure of the compound conductor suspending bars is shown clearly in Figs.

3 to 6 above, and the arrangements for connecting up and for limiting the rocking are shown below. One of the special features of Cowper-Coles' process is the addition of zinc fume or powder to the electrolyte. The zinc dust is readily kept in suspension, as the solution employed is very dense. The addition of the zinc fume enables more than the theoretical deposit to be obtained under favorable conditions, and overcomes almost all the difficulties appertaining to the electro deposi-

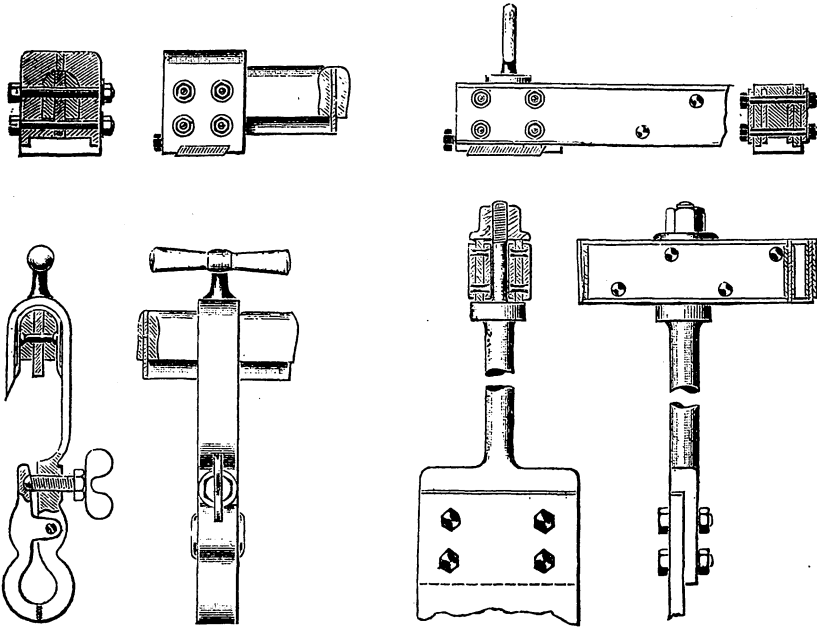
possible by the ordinary hot galvanizing. This renders the new process especially suitable for coating the plates of the hulls of fast vessels, such as torpedo boat destroyers. As pointed out by Sir Gabriel Stokes, in addition to the element of resistance depending on the formation of waves continually propagated away from the ship, there is the effect of retardation due to the roughness of a ship's bottom out of all proportions to the mere increase of virtual dimensions, which is explained

Manganese in Foundry Iron.

A. P. BJERREGAARD, NEW YORK.

Manganese acts on foundry pig iron in three ways, all deleterious: 1. It renders it brittle. 2. It causes carbon to remain combined when it would otherwise crystallize as graphite. 3. As will be shown, it tends to lower the amount of silicon in the iron. It is manifest, therefore, that this element should be kept as low as possible. Hence when it becomes necessary to use an ore containing a large amount of manganese some means must be found to force it to enter the slag and not the pig iron.

Sulphur and manganese, when present together in molten pig iron, have a great affinity for each other. The Hörde process for eliminating sulphur from pig iron by means of manganese is based on this fact. In order to ascertain whether the same reaction could be made use of to eliminate manganese some experiments were made at a certain coke furnace in the South during July, 1892. An ore was then in use there containing more manganese than was desirable. The iron produced was forge, and contained on an average 1.70 per cent. of manganese, and no sulphur. Five pounds of pyrite, containing 38.61 per cent. of sulphur, were put into the furnace with each charge. This addition resulted in producing a pig iron with 1.11 per cent. manganese and no sulphur. The quantity of pyrite was now increased to 10 pounds per charge. The resulting iron contained but 1.06 per cent. of manganese and no sulphur. A further increase of the pyrite to 15 pounds per charge



Figs. 3 to 6.—Anode and Cathode Suspension Bars.

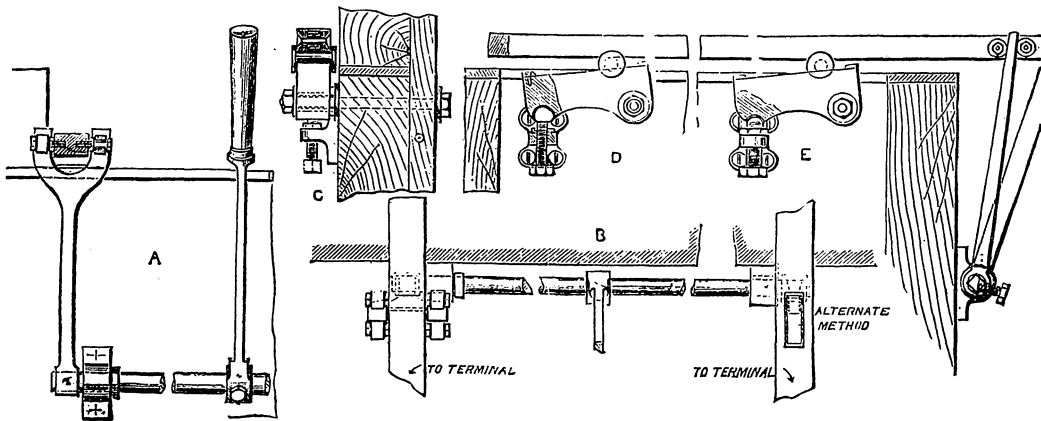


Fig. 7.—Cathode Bar Suspenders and Rocking Frame.

THE COWPER-COLES COLD GALVANIZING PROCESS.

tion of zinc. The zinc powder employed is obtained direct by the process of distillation from the ore.

The thickness of the zinc coat, says *Industries of London*, applied by dipping the articles to be galvanized in a bath of molten zinc can be varied only within very narrow limits, except in the case of thin plates, which can have the excess of zinc squeezed off by rollers when leaving the bath. The cold galvanizing process allows of the thickness of zinc coat being readily varied from a few grains per square foot to 1½ ounces, which is a matter of some importance, as for many classes of work it is not desirable to have more than ½ ounce of zinc to the square foot. Another advantage of the cold process is that a much smoother surface and a more equal distribution of the zinc is obtained than is

by the consideration that the little roughnesses form the birthplace of eddies.

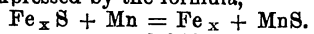
The time in the zinc plating bath is as follows :

Table of Time.

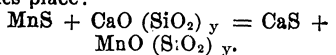
Weight of zinc required.		Thickness of coating.	Time of immersion in bath.
Per superficial foot.	Per superficial yard.		
Ounces.	Ounces.	Inch.	Minutes.
½	4½	0.00081	5
¾	6¾	0.001291	7
1	9	0.001722	8
1¼	11¼	0.002152	10
1½	13½	0.002583	13
1¾	15¾	0.003013	17
2	18	0.003444	20

brought the manganese down to 0.88 per cent. with a trace of sulphur. The various slags produced were not analyzed, but it is fair to conclude that both the manganese and the sulphur were forced to enter them.

We may suppose the reaction that takes place in the molten pig metal to be expressed by the formula,

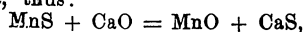


The manganese sulphide thus formed rises and enters the slag, where, coming into contact with molten calcium silicate the following reaction probably takes place:

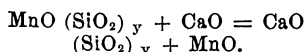


Slags containing much manganese are of a yellowish green color. We may suppose, therefore, that the manganese silicate formed in accordance with the

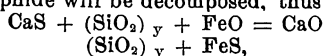
above formula is of that color, or else that a compound of CaS , CaO (SiO_2)_y and Al_2O_3 (SiO_2)_z, similar to ultramarine, but containing calcium instead of sodium, and of a greenish color, is formed. From the analogy between manganous and ferrous salts we see that MnO (SiO_2)_y is easily fusible and difficult to reduce, especially when present in small quantity dissolved in much slag. If these supposed reactions are correct, it follows that manganese can only be eliminated from pig iron by means of sulphur, when the slag is not too basic. In that case the manganese sulphide or silicate would be decomposed by the excess of lime, thus:



or:



The manganese oxide so formed is easily reduced and therefore liable to re-enter the iron. If, on the other hand, the slag is too acid, the calcium sulphide will be decomposed, thus:



and the iron sulphide formed will enter the iron. A neutral slag is, therefore, an absolute necessity for the success of the operation.

From observations of the author, extending over more than two years and involving the analysis of several hundred samples of pig iron, it appears that manganese has the curious property of reducing the amount of silicon that a pig iron will carry. It has been an almost universal rule that if the manganese was above 1 per cent. the silicon was below 2 per cent. Sometimes the iron, in spite of its low silicon and high manganese, would still have a good crystallization. But usually when the silicon was low the grade was also low.* In the pig iron under consideration manganese was never over 2 per cent. In view of the extraordinary behavior of manganese when alloyed with steel in different proportions, we cannot say that larger amounts of manganese would have the same effect on the silicon.

If it were not that the manganese remains in the iron, while the silicon leaves it, we might suppose that a manganese silicide is formed, in a manner similar to the manganese sulphide described above.

A few examples, taken at random from my laboratory book, of the inverse variation of silicon and manganese, are given in the following table. The figures are arranged according to the percentage of manganese; the corresponding percentages of silicon being given in the second column. The first example is a white iron, the rest are forge and foundry.

Manganese.	Silicon.	Manganese.	Silicon.
1.71	0.37	0.92	1.88
1.68	1.03	0.91	2.45
1.65	1.00	0.86	2.30
1.54	1.47	0.85	2.31
1.54	1.88	.84	2.92
1.52	1.43	0.71	2.56
1.48	1.18	0.69	2.81
1.42	1.76	0.68	2.82
1.39	1.75	0.62	2.36
1.36	1.41	0.61	2.67
1.33	1.22	0.58	2.63
1.08	1.83	0.45	3.35
0.95	2.08	0.44	2.92

Undoubtedly the condition of the furnace as to heat, acidity of slag, &c., had a great influence on the quantity of silicon absorbed by the iron, espe-

cially on its irregular variation. It may even be that certain conditions of the furnace may entirely obliterate the effect of the manganese, thus producing a pig iron high both in manganese and silicon. The tabular comparison given, however, is remarkably instructive in showing what a powerful effect manganese has upon the silicon when its action is not disturbed by other agencies.

Professor Ledebur has shown that when spiegel is fused with excess of silica the manganese reduces the silica, itself being oxidized and combining with the remaining silica, thus producing gray pig iron and a slag of manganese silicate. Green and Wahl, on the other hand, have recently found that if ferrosilicon and manganese oxide are fused together with lime, the silicon reduces the manganese, a spiegel and a slag of calcium silicate being formed. These experiments show conclusively that the reaction to take place in a given case is governed entirely by the conditions prevailing. We cannot say that silicon or that manganese is the stronger in affinity. Especially does Ledebur's experiment throw much light on the supposed anomalous cases when both much manganese and much silicon exist in the same pig iron. Such a composition could perhaps be produced by a very acid slag when an ore high in manganese is under treatment. The ordinary conditions holding in the blast furnace are nearer to those of Green and Wahl's experiment than to those in Professor Ledebur's; hence these experiments confirm my statement that manganese reduces the silicon a pig iron can hold. It is safe to say, therefore, that in a blast furnace making gray pig iron if the manganese is high, say over 1 per cent., the silicon will be low, say under 2 per cent.

J. Philips Bedson of the Steel & Wire Company, Middlesbrough, England, in discussing a paper by Mr. Worth on "Economy of Steam in Rolling Mill Engines," referred to the employment of electricity as a motive power in iron and steel works and other manufactories. Its success, he said, was demonstrated. He had been in a factory in Belgium not long ago where they were using 600 to 700 horse-power. They had tested some of their engines, and found they were using 33 kg. of water per horse-power. They have now put down an electrical plant, new pumps to work at 150 pounds pressure, a compound condensing engine for driving the main dynamo that was to replace the whole of their power, and they will dispense with the whole of their steam plant in the course of a short time. That was a specimen of what was being done abroad. They were erecting these expensive motors where large quantities of dust and dirt were encountered. They expected to have an economy of 75 per cent. It seemed a large figure. He was somewhat enthusiastic about the use of electricity, and he could cite a few figures which were convincing. He felt that in England they were behindhand as regarded the application of new powers. They looked upon electricity as a splendid thing for illuminating purposes; but as regards its adaptation for producing power they were very much in the background. The Continental people were far in advance. In a small arms factory in Belgium, where 30,000 kg. of coal were being used in a given trial, the Government decided to take out the whole of their steam engines, and

put in one boiler and one engine for driving one main dynamo, and their coal bill dropped from 30,000 to 8000 kg. Again, three small arms factories in Belgium, France and Germany, all producing the same class of rifles, and similarly equipped; two were driven by the best steam power and one had its machinery actuated by electricity up to 600 horse-power by a pair of compound condensing engines. In the steam driven factories it took 3½ to 4 horse-power per rifle, and in the electrically driven factory they were producing them for 1½ horse-power.

Ramapo's Early Industries.

A correspondent of the New York *Evening Post* furnishes some very interesting information concerning the early industries of Ramapo, N. J., which figure prominently in the development of manufactures in this country:

The village was founded in 1793 by Josiah G. Pierson and Jeremiah and Isaac, his brothers, who were engaged in the manufacture of cut nails by machinery of their own invention. Their machines were the first invented in this country, and among the first in the world, and were patented in 1795. They used Russia iron, but rolled and cut it at Wilmington, Del. They soon found, however, that American iron could be used and so they came up here and started their works, which were ready in 1798. There was a good demand for their products and especially for their nails by the planters of Cuba. In 1807 they began to manufacture hoops for whale oil casks. In 1814 a cotton mill was begun and finished in 1816. Mr. Pierson invented a loom which wove striped sheeting and shirtings and checks, and is the basis of those now in use. The object of this venture was to pay Russia for the iron which they bought of her. It was very successful.

At this time the village had a population of over 700 people, and farmers from Orange and Bergen counties found there a ready sale for all their produce and plenty of teaming to do by contract. In 1810 the manufacture of steel was added, and all these various enterprises were kept up for years. In 1835 began the manufacture of common wood screws, the first attempt in this country. Previously these were imported, mainly from France, and were not like the present screw, pointed on the end, but flat. The business was up hill work for a long time, but it was of sufficient importance to be worthy of some thought. Finally one Mr. Krum produced a machine which worked well, but the screw business was attracting the attention of other firms, and a man appeared who claimed to represent a Rhode Island syndicate who wanted to buy the machines. He looked them over, ascertained the price, and left, promising to decide on the matter in a few days. In a short time he wrote that his firm had changed their mind and the bargain was off.

A few years passed away and one day a screw maker on the tramp asked for a job. He was set at work and his dexterity immediately attracted attention. When questioned he answered that he had worked on such machines in Providence, R. I. A suit was accordingly begun in the United States Court before Judge Story, which resulted in a verdict for the plaintiff in \$3000 damages and a stoppage of the Providence works. In the trial the defense pleaded Reed's patent, and then it was shown

* See an article on "Silicon and the Grading of Pig Iron," in *The Iron Age*, November 30, 1893.

that a man had broken into the Ramapo works and taken wax impressions of the machines, from which he had constructed his machines. Then the Providence people wanted to purchase the patent and its rights. Twenty thousand dollars was asked, to which they demurred. At their suggestion arbitrators were chosen, who sustained the price, and the \$20,000 was counted out immediately in \$100 bills, and the machines passed into their control. Somewhere about 1845 Krum in working allowed a screw to slip and produced thereby a gimlet point. He immediately seized upon the idea and finally produced a machine which made the modern screw. This gave a great impetus to the work, but soon an agent of the Taunton, Mass., works appeared and bought the patent and its rights, and thus the screw business passed from Ramapo. In 1850 it was decided to give up the business, and since then the village has dwindled away.

The Emery Testing Machines.

The third meeting of members of the American Society of Mechanical Engineers was held at the house of the society on the evening of the 14th, when a paper describing the recent improvement in the Emery system of testing machines was read by J. Sellers Bancroft, manager of William Sellers & Co. of Philadelphia. We take the following extracts from this paper, and would also refer to an article on these machines published in *The Iron Age* of February 15, 1894, and which contains perspective views of several different types:

The essential peculiarity of the Emery testing machine is the method by which the stress produced upon the piece tested is conveyed to the scale and accurately weighed by mechanism that is entirely frictionless and that hence responds to the same increment of load regardless of the amount of strain upon the specimen.

This result is accomplished by receiving the load upon a hydraulic support or upon a group of them, as the case may be. The general scheme is indicated in Fig. 1, which merely shows the relation of the parts, no attention being paid to proportion. The depth of the cylinder *a* is exceedingly small. The end is closed to prevent the escape of the contained fluid by a thin sheet of metal, *b*, upon which rests a piston, *c*, considerably smaller than the internal diameter of the cylinder; this piston is secured to the cylinder by a thin flexible fixing plate or plates, *d d*, which permit a very small movement in the direction of the axis of the cylinder while rigidly securing it against any lateral movement; this longitudinal movement of the piston from no load to full load is not more than, say, 0.003 inch and as there is no hydraulic packing and no sliding there is no friction beyond that of the fluid. This hydraulic chamber is connected by a pipe, *e*, with a smaller but similar chamber, *B*, placed in the scale, which may be at any reasonable distance. The piston *c'* of this latter chamber acts through the block *H* against the first lever *C* of the scale, which thus receives a fraction of the load upon the piston, determined by the relations between the areas of the two hydraulic cylinders *A* and *B*.

The scale body is a rigid cast iron frame, indicated by the shade lines

under the lever supports *G*, *G'*, *G''*, and over the reducing chamber *B*. All the supports and connections of these levers are thin flexible plates of steel firmly secured or clamped to the levers and their supports and having a sufficient exposure between their fixed ends so proportioned to their thickness and the loads they have to carry that the amount of bending due to the movement of the levers shall be well within the elastic limit of the material. The long arm of the lever *C* is coupled by the bar *D* with the short arm of the poise frame lever *E*.

Applying the Weights.

The long arm of this lever carries all the standard weights of the scale and the method of putting them on or taking them off is peculiar to the Emery

poise frame. A small movement downward transfers one weight to the poise frame, the beveled surfaces on the brackets centering the weight if it is displaced sideways by a too sudden movement. A further movement transfers another, and so on—that is, the movement of the weight frame in either direction transfers the weights singly and successively from one frame to the other. The weights *f* and *g* are shown carried by the poise frame *j* and *k* by the weight frame, while *h* is being transferred from one to the other.

The operating hand lever is provided with a notched segment, into which a click spring plays, so that the operator feels when he has moved the lever the right distance to transfer a weight without having to watch the indicator as formerly, and the arrangement of the

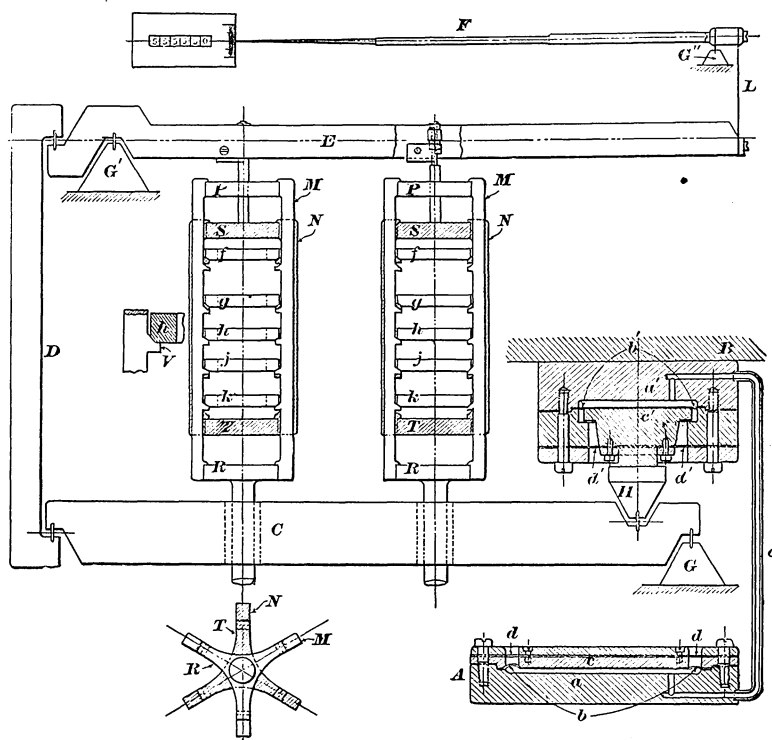


Fig. 1.—General Scheme of Machine.

THE EMERY TESTING MACHINES.

system. Suspended from this lever *E* at suitable intervals by thin fulcrum plates are poise frames *N*, consisting of an upper cross head, *S*, and a lower cross head, *T*, united by three vertical bars disposed at equal intervals about the cross heads.

These bars are provided on their inner faces with short projecting brackets, *V*, having a horizontal surface and a beveled surface which correspond with similar surfaces formed on the weights *h*, which are short cylinders or rings with beveled edges; the weights are carried by the flat surfaces and centered by the beveled surfaces. A weight frame, *M*, of the same construction, has its three vertical bracketed bars alternating with the bars of the poise frame. This weight frame is guided and is raised and lowered in a vertical line without touching the poise frame, by a rock shaft and hand lever coupled to the rod projecting from the cross head *R*. The brackets on the weight frame bars are differently spaced from those on the poise frame, and when the weight frame is at the top of its stroke it carries all of the weights clear of the

six bars surrounds the weights by a cage that effectually prevents any displacement and consequent interruption of the test, as sometimes occurred when the weights rested on simple shelves secured only by short pointed pins. There is hence no necessity for opening the glass case that incloses this part of the scale, and the weights are never exposed to any risk of alteration. The weights in the first poise frame have a value of 100 pounds, the next frame carries weights of a value of ten times as much, or 1000 pounds, the next 10,000 pounds, and so on, and the readings are summed up by a series of segments connected to the several operating shafts and provided with figures denoting the number of weights on each poise frame. A horizontal slot in a vertical plate near the upper left hand corner of the scale is so placed that the reading of the figures shown through this slot denotes the number of pounds pressure applied to the specimen.

The final lever of the scale is an indicator needle, *F*, which has a movement at its point of $1\frac{1}{4}$ inches to 2 inches, and this movement, calculated from the me-

chanical ratios of the hydraulic chambers and of the levers in the scale, is not less than 300,000 times the movement of the piston *c* in the first hydraulic chamber, and may on large machines be 6,000,000 times as much. The transfer of fluid from one chamber to the other is almost imperceptible and while it takes force to move the metal sheets and to bend the steel fulcrums, yet this force is all returned as the various parts resume their position of equilibrium, the needle returning to the same zero point after being disturbed in either direction.

axes of the two heads in the same straight line. A draw bar, 70, is secured in the axis of these beams by two thin annular steel plates, 72, bolted against shoulders near the ends of the draw bar and secured firmly in recesses formed in the outside face of each beam. These plates hold the draw bar securely in line with the axis of the machine while permitting a free motion to a limited extent in the direction of the axis. The projecting end of the draw bar is provided with a screw thread by which the compression platform or the tension holder is secured to it. The draw bar

the small distance required. On each side of the hydraulic support steel collars, 71, are screwed and secured to the draw bar; these collars are provided on the periphery with a series of ribs, Fig. 3, parallel with the axis of the draw bar, and which lie between without touching similar ribs projecting from the interior surface of the annular beams. The ends of all these ribs on the two beams and the collars are accurately faced to true planes at right angles to the axis of the draw bar, and the distance between the two extreme faces of the hydraulic support is made slightly less than the distance between these two planes. Movement of the draw bar in either direction carries the hydraulic support against the ends of the ribs in one annular beam and brings the ends of the ribs on one of the collars on the bar against the opposite side of the hydraulics support, and produces pressure on the contained liquid, which is transmitted through the pipe 63 to the small hydraulic chamber in the scale. For the purpose of insuring that everything about the hydraulic chamber has a solid bearing, it is necessary to produce an initial loading of about 5 per cent. of the maximum load, which is done by applying a definite spring pressure to move the draw bar in the direction in which the stress to be applied to the specimen will move it, and after this the scale is balanced in the usual way by sliding weights on the poise beam. In order to prevent the shock of recoil resulting from the rupture of a large specimen of high steel from doing injury to the thin brass plates in the hydraulic support, the abutting piece, 64, of the support, which rests against the ribs in the annular beam, 65, when strains of tension are applied, is made larger in diameter than the hydraulic support proper, and is provided with a spiral or screw face, 66, which engages with a corresponding screw face formed on a rotatable ring, 67, fitting in the other annular beam, 69. After the initial load has been applied this ring is rotated by the pinion shaft, 68, to bring the screw faces in contact, Fig. 4, and the abutting piece, 64, is thus clamped firmly to the annular beam against which it rests. When the specimen breaks its first blow is delivered through the draw bar and ribbed collar to this abutting piece, 64, which transmits it through the ring 67 to the rear annular beam 69, and as these beams 65 and 69 are rigidly united, the blow is absorbed by the total mass of these two beams. The hydraulic support is thus thoroughly protected and these machines can be used regularly for breaking high steel specimens up to the full capacity of the machine without any risk of injury.

The weighing head is returned to its place on the bed after movement due to recoil by a set of spiral springs locked up in boxes secured to the bed; these springs are strong enough to move the head and their resistance diminishes greatly the movement due to recoil, while the friction of the head upon the bed rapidly wipes out the oscillations.

The annular beams bolted together as described constitute one built up beam to resist the bending due to the pressure on the draw bar midway between the straining screws. The hydraulic support is thus inclosed in a rigid mass of cast iron and effectually protected against injury from violence or from being gummed up by oil from the straining cylinder, as has occurred with the upright machines, and the

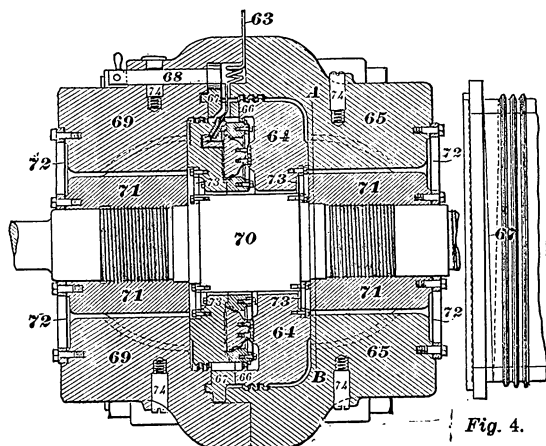


Fig. 2.

Weighing Head.

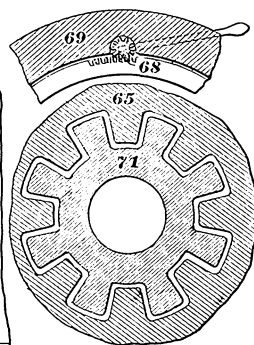


Fig. 3.

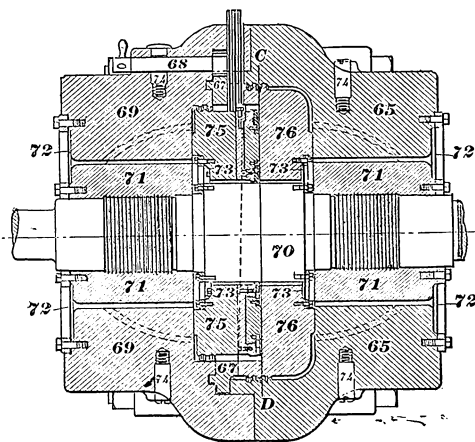


Fig. 5.

Hydraulic Support for Very Large Machines.

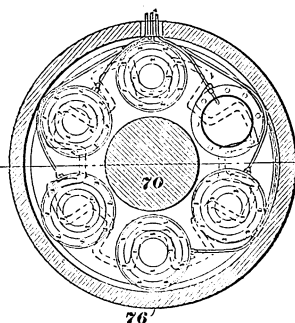


Fig. 6.

THE EMERY TESTING MACHINES.

The Emery testing machines are now made horizontal instead of vertical, in the first place to make all sizes of machines of one type, and in the second place to get certain advantages in overcoming the shocks of recoil. In all but the very smallest size of machines the weighing head and the hydraulic cylinder *c* straining head are carried and aligned by the top surface of a wrought iron bed.

The Weighing Head,

Fig. 2, consists of two circular or annular beams, 65 and 69, firmly secured together by bolts placed around their periphery and by the straining screws which pass through both beams and clamp them by a shoulder and nut. This head and the straining head fit easily upon the bed, which maintains the

is enlarged in the middle, and against each of the two shoulders thus formed is secured a thin annular steel plate, 73; these plates are for the purpose of carrying and centering the hydraulic support, which is made annular instead of circular, as shown in Fig. 1, and is placed centrally about the axis of the draw bar, so that the end stress on the draw bar is resisted symmetrically by the hydraulic support, the part corresponding to the cylinder being secured to one plate and an abutment ring secured to the piston being secured to the other plate, while the cylinder and piston are also separately coupled by flexible plates. By this means the hydraulic support is maintained in fixed relation with the draw bar laterally, while it is left free to move relatively to it in the direction of its axis through

frictionless movement of this support under all conditions of service is thus insured.

Hydraulic Support for Large Machines.

Figs. 5 and 6 show a method of making the hydraulic support for very large machines or when the annular support just described would become too large to be rated by the support testing machine. In this case the supports are made circular and are grouped symmetrically about the axis of the draw bar; as shown in Fig. 5, they may be all coupled together by one pipe or connected as shown by individual pipes to one or more reducing chambers in the scale. The cylinders of the supports are secured to the ring 75 and the pistons to the ring 76, which is provided with a screw thread on its overhanging rim, and is clamped by the ring 67, as before described.

The Straining Screws.

Two straining screws, 77, are provided, Figs. 7, 8 and 9, fixed firmly to the weighing head and passing freely through bearings, 88, formed on each end of the straining head 87; a revolving nut, 89, provided with gear teeth on its periphery, is placed on each straining screw between the two bearings 88 formed on the sides of the straining head; these nuts are revolved by the wide face pinions 90, driven through the bevel wheels 92 and 93 by a balancing train of gearing consisting of a gear wheel, 96, carrying two balancing bevel pinions, Fig. 9, meshing with two bevel wheels, one on each side of the gear wheel 96, so that power applied to the gear 96 is by means of the balancing pinions divided equally between the two bevel wheels, and thus imparts equal pressure to the revolving nuts 89 on the straining screws.

This arrangement does away with the necessity heretofore existing of having the straining screws of exactly similar pitch throughout their length. With this construction the screws could be of different pitches, the alignment of the heads being secured by the fit of the screws in their bearings and of the heads on the wrought iron bed or shear; by driving this train of gearing, either by hand or by power, the straining head is moved back and forth upon the bed to accommodate the varying lengths of specimens; when the head is adjusted to place, the nuts form the abutments upon the screws to resist the movement of the cylinder for strains of compression or extension. The nuts 89 do not fit snugly endwise, as heretofore, but a space of several inches is left between the ends of the nuts 89 and the faces of the bearing 88, Fig. 7. This provides for the shock of recoil when breaking a long and large specimen. The sudden release of the straining screws from their load when the specimen breaks, together with the force resulting from the sudden contraction of that end of the specimen attached to the straining head, merely give the head a push along the bed and it slides freely until its momentum is absorbed by its own friction, the space between the revolving nuts and the bearings allowing ample room for this travel under the best conditions of lubrication. This head is thus entirely cut off from the rapid vibrations of the straining screws and the necessity of making the nuts an exceedingly good fit to both screw and head is entirely avoided.

The straining head is provided with

a piston packed to receive fluid pressure in either direction, and the piston rod passing through a packed bearing in one end, is provided with a screw thread similar to that on the draw bar, to receive the various holders. The fluid is supplied to this straining cylinder through two systems of jointed

11. A steel case consisting of the two parts 99 and 107 united by the nut 108 is secured to the end of the draw bar or piston rod by the screw thread described. The gripping jaws 110 are two cylinders that slide freely in cylindrical holes bored in the case 99, at an angle of about 20° with the axis of the

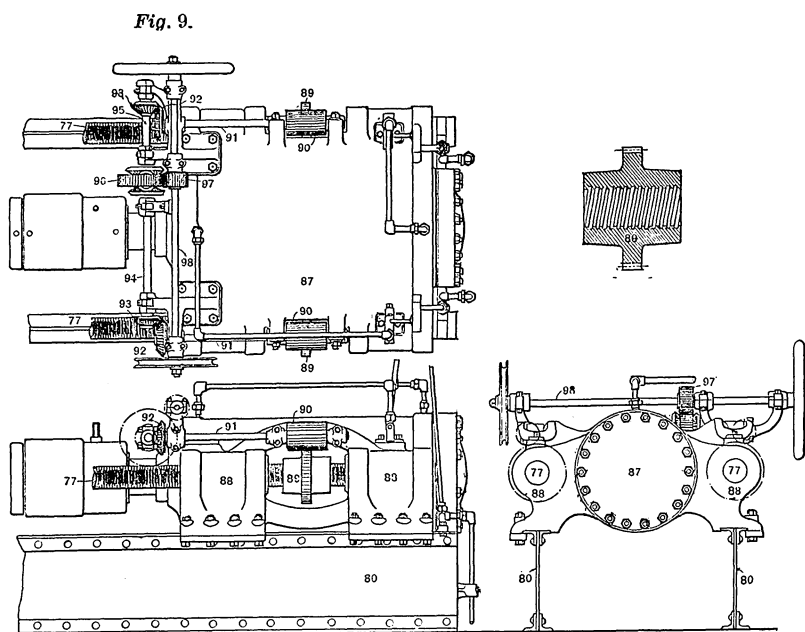


Fig. 7.

Fig. 8.

Arrangement of Straining Screws.

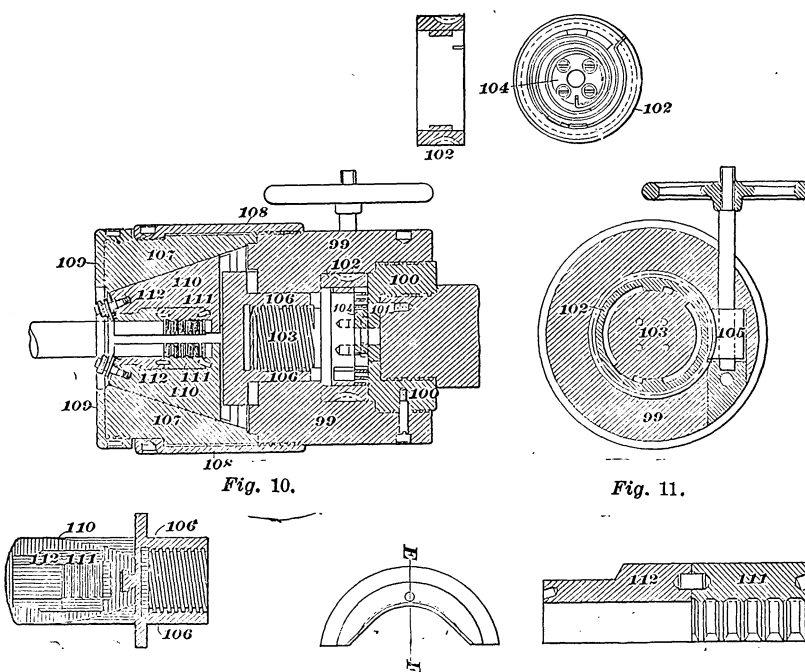


Fig. 10.

Fig. 11.

The Tension Holder.

THE EMERY TESTING MACHINES.

pipes, which are connected through the valves at the scale case with the pressure pump and the tank respectively, so that each pipe acts either as a pressure pipe or an exhaust pipe, depending upon the direction in which the strain is to be exerted upon the specimen.

The Tension Holder,

for gripping specimens for extension tests, is shown in section in Figs. 10 and

case, making an angle of, say, 40° with each other, the axes of the jaws and of the case, being in the same plane. The rear end of each of these jaws is provided with a T-slot lying in this plane and at right angles to the axis of the case which engages with a T-rib formed on a cross head, 106, that fits in a bearing in the case and compels the jaws to move equally and simultaneously. The cross head is provided with

a screw thread in its interior to receive an abutment screw, 103, which forces the jaws forward and closes them upon the specimen. This screw is operated by an annular worm gear, 102, provided in its interior with two narrow lugs, which engage with two similar lugs formed on the abutment screw, so that the worm wheel could make almost a half revolution without moving the screw, to which it is coupled by a strong spiral spring. Cylindrical recesses are formed in the opposing faces of the jaws to receive the hardened steel gripping dies 111 and 112, which are made of various sizes and shapes, to receive flat, square or round specimens. The forward half of these dies, 112, is made parallel and smooth and of shape to conform to the section of the specimen. Following this the die 111 has a series of alternate V-shaped ridges and grooves running transversely to the length of the specimen, the apex of the ridge next to the parallel die 112 being truncated, so that it stands a very little above the surface of the parallel die; the next ridge is truncated less and stands higher, and so on until the last ridge, which is left sharp. The dies are closed upon the specimen to be tested by turning the worm wheel, which by means of the abutment screw 103 and cross head 106 pushes the jaws forward until the sharp ridge on the dies rests against the specimen; further revolution of the worm gear then winds up the spiral spring until the driving lugs on wheel and screw come in contact, when the sharp ridge is forced into the specimen sufficiently to insure that the friction between the dies and the specimen shall be greater than that between the jaws and the case. When stress is applied to the specimen the jaws will be drawn forward, sinking these ridges successively into the specimen until the parallel part of the dies grip it firmly, the idea being that the parallel part will hold with more than sufficient friction to compensate for the depression made in the specimen in the first ridge, and so on to the last, so that a bar of metal can be put into this holder without any preparation and broken without any risk of being broken in the gripped part. As the jaws are drawn forward the spiral spring unwinds and keeps the abutment screw tightly pressed against the cross head, holding it against the ends of the jaws and taking up all lost motion, so that accurate centering and gripping of the specimen, no tearing strains, accuracy of weighing at all times, definite weights applied at each movement, and great rapidity for commercial testing are attained. When the specimen breaks it will in all cases be firmly held in the dies, and there will be no disturbance nor flying pieces, nor any noise beyond that of the broken piece itself. The paper closes with a description of the machine employed for rating these testing machines.

Discussion.

In answer to a question Mr. Bancroft said there was one lever for each weight in this machine. Each frame has a lever, which is provided with a click spring. In the scale each weight is indicated by a small indicator. On the regular testing machine these are grouped together, so that the total consumption of weight is indicated in one line.

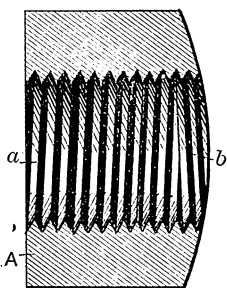
Professor Hutton presented lantern views of some of the earlier types of machines, the characteristic points of which were briefly explained by Mr. Henning. These were presented as a matter of historical interest. The first views

were of the present form of the Emery machine and the first Emery machine at the Watertown Arsenal. These were followed by views of the old Fairbairn machine and Fairbank-Ewing design of about 1873. In the latter the strain was weighed directly by a compound beam. Early machines were shown designed by Prof. Charles P. Rogers, of which Professor Hutton said: "I know that when I saw it about 1875 Professor Rogers had made considerable alterations in it, and one of the interesting features was the method by which the weight was added. The plan pursued was that on the end of the weighing machine was a rod which went down into mercury, and as the specimen was stretched that mercury was drawn downward, so that more and more of the rod failed to get the support of the mercury. Consequently a very gradual application of the load was possible."

Pictures of a lever machine, designed by Major Wade, the large Fairbanks machine, a machine designed by Professor Martens, director of the Royal Laboratories at Charlottenburg, Berlin, and several English machines were thrown on the screen.

The Brinkerhoff Lock Nut.

The nut A is threaded throughout the greater part of its extent in the usual way, as shown at *a*. The remaining portion of the aperture is formed



The Brinkerhoff Lock Nut.

with reverse threads *b*. In using this nut the reverse threads near its outer end engage the outer threads of the bolt, and a binding action takes place. In addition the reverse threads engage each other in such a way that they may be said to interlock, with the result that on a retrograde movement of the nut this engagement will tend to force the nut toward the head of the bolt. While the nut cannot be jarred loose from the bolt it can be removed and replaced with the aid of a wrench as often as may be required, and each time it is replaced it will lock as at first. On the first of last June some of these nuts were placed on track bolts in the railroad yard at Sayre, Pa., and in a part of the track where there had been the most trouble from nuts working loose. When examined by the superintendent of the yard in January the nuts seemed to be as tight as when first put on the bolts. These nuts are made by the National Bolt, Nut & Rivet Works of Reading, Pa.

Numerous general improvements are being made about the Watervliet, N. Y., arsenal and gun foundry. The new shop of the gun foundry has been entirely equipped, but is not yet entirely in operation, chiefly on account of the fact that there is not sufficient work to demand it. The equipment of the arsenal with electric lights is progress-

ing rapidly. Two large dynamos arrived last week. A few days since a test was made of the large scales put in by the Fairbanks Company. A large gun weighing 5600 pounds was placed on the scales and it weighed up to within an ounce of the prescribed weight. A two-dollar bill was then placed upon the beam and it dropped immediately, showing that the balance was perfect. The scales are the largest in this country.

Tests of Aluminum Boats.

Tests recently made by experts of the Navy Department of aluminum life boats, just built by a firm in Baltimore for the Wellman Arctic Expedition, are reported to have been remarkably successful. The first boat completed, which is 18 feet long, 4 feet beam and 2 feet deep amidships, weighing 350 pounds, was placed in the water empty and a man endeavored unsuccessfully to capsize it by sitting on the gunwale. Then it was loaded with a weight of 4461 pounds, yet the boat remained above water amidships 4½ inches. The boat was afterward unloaded and the air tight compartments were tested by capsizing the boat, but it was found impossible to get it more than half full of water, since the compartments held it so high out of water as to act on the principle of a self bailer. The boat was then taken alongside the wharf and filled with water until the gunwale was flush with the surface, and then a man got on either end over the air tight compartments. Still the boat did not sink, and as soon as it was cast loose it heeled over and emptied out one-half the water and then righted itself. The air tight compartments were subsequently tested by being filled with water, and when the doors were screwed down the boat was rolled over and the compartments were found to be perfectly tight.

Two other aluminum boats now in course of construction will be subjected to similar tests when completed, and the naval officials will make a special report on the subject to Secretary Herbert. The Secretary of the Navy is said to be much interested in the matter, as the indications point to a wide field of usefulness for aluminum life boats in the naval and life saving services.

Breaking the Rod Mill Record.

The American Wire Company of Cleveland report some extra good work in their Garrett rod mill. During the week ending March 17, they rolled 1524 gross tons of finished merchantable rods, in 11 turns, aggregating 108 hours, *i.e.*, ten hours every day except Saturday, and on Saturday, eight hours. The best turns were 352,000 and 357,000 pounds, respectively, made on Wednesday, day and night, respectively. This is believed to be the best week's record in this kind of mill. Some very good work was also done in the continuous rod mill of the American Wire Company. During the week ending March 17 there were rolled 657 gross tons of finished merchantable rods, No. 6 gauge, through a single pass.

Recently a Pittsburgh concern captured a considerable order for stills and tanks for a petroleum refinery in Java, in competition with English and German concerns. The contract amounted to about \$47,000.

Uniformity in Testing.

BY P. KREUZPOINTNER.

In the every day transactions of buying and selling materials the purchaser generally fixes for himself some kind of a guide or standard wherewith he judges the quality of the material he intends to buy. Whatever the standard or measure of quality may be, it is important to both the consumer and producer that this standard be essentially the same at all times. This is so self evident that it hardly needs to be argued.

With articles or materials undergoing such deterioration or decay as to become manifest to sight, smell or feeling, the determination of quality becomes a comparatively easy matter, and the standard is set by the taste or purchasing power of the consumer. There are materials, however, the quality of which may vary within a certain range. Both the extremes of this range, and all the variations of quality between the extremes, may meet the standard of quality established for the material in question. For instance, in a given material the quality may vary along an imaginary line, A B C D E F. Yet it is considered suitable for its purpose at every point of the line from A to F. Thus six different consumers may establish their standards of quality for that material. Yet each one may be right, though only one can of necessity get the better material among the six, because only at one point can the material approach the state of highest quality and perfection, and all the other five points must recede from it more or less.

We find this condition prevailing in the purchase of steel especially. That such a condition must lead to confusion and controversy is clear. Nor does it tend to raise the standard of quality. There is rather a tendency toward deterioration of quality, because of want of uniformity of opinion what quality or qualities should be considered best in a metal.

At first sight it would seem as though engineers did not know their business. Yet the peculiarities of iron and steel are such that an engineer may be high up in his profession and know a good deal of the qualities of metals, but still be very much mistaken when called upon to establish standards of quality and carry them into practice.

The reason for this apparent anomaly we can find in the fact that a piece of steel is not such a rigid, immovable body as many imagine it to be; but, on the contrary, is full of life and animation. To study all the peculiarities of the nature of steel, to see the effects of varying influences upon the metal, to note the expression of its countenance, so to speak, under proper use and under misuse, to be able to interpret the language with which steel appeals to us when we torture it on the rack and with the thumb screw of theoretical tests and practical application, to effectually and economically blend quality and design, requires a familiarity with the nature of steel which only those can appreciate who have the opportunity to observe the metal under all possible influences of manufacture and effects of service. Comparatively few engineers have such opportunities, or they have an extended opportunity to study the behavior of steel in one direction only, and not in all directions. Hence that diversity of opinion and often too great reliance in the efficacy of applied mathematics when dealing with metals

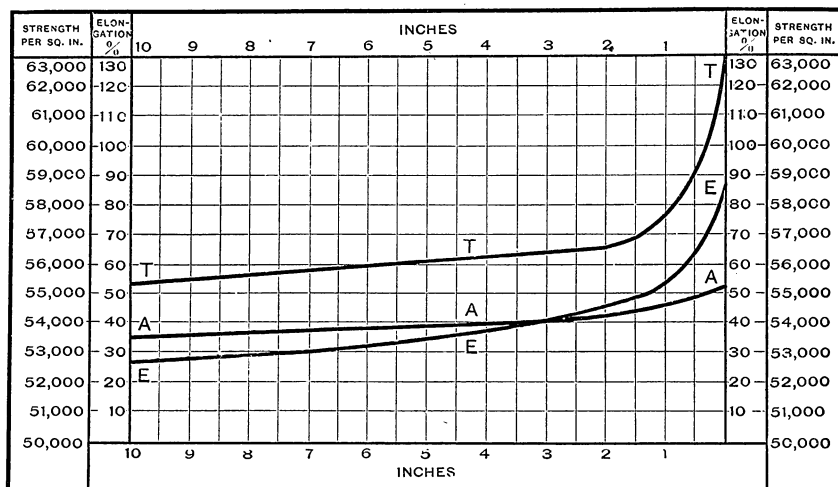
the nature of which may vary within certain limits.

The crucial point in the whole question pertaining to the methods of testing steel is to decide not only how the metal will be affected by the manner of testing, but to what extent testing represents the changes which the steel may undergo in service. If the methods of testing are faulty, the engineer is deceived in his conclusions. What are the factors which tend to introduce variability in results of testing, according to method adopted?

At the bottom of all changes which occur in steel when that metal is subjected to strain lies the phenomenon of flow of the molecules composing the mass of the metal. All metals flow more or less. Hence any method of testing adopted which in any way hinders or unduly accelerates the flow of the metal will produce erroneous results; erroneous in proportion to the difference in the

The so-called 8-inch test piece, however, offers a considerable saving in metal and in work of preparation, and differs but slightly in results from those obtained in a 10-inch section. Therefore this section has been accepted almost universally by engineers as a standard. Any other section, shorter and less in sectional area than $\frac{1}{4}$ square inch, gives results higher and therefore less reliable than the 8-inch section.

In a short section the metal cannot flow properly. The molecules are held back by the disproportionate size of the head of the test piece; or the grips, if a parallel sided test piece; the shortness and thinness of the section does not bring sufficient metal into play to assist, as it were, the metal at the weakest point, where rupture will take place. The molecules, instead of being allowed to flow from their original positions toward the point of rupture, are forcibly torn out from between



T, Tensile Strength.—E, Elongation.—A, Contraction of Area.

INFLUENCE OF LENGTH OF SPECIMEN UPON RESULTS OF TEST.

method with what the nature of the metal to be tested would practically require. He who has ample opportunity to observe the phenomena of flow in steel under various conditions and methods of testing can appreciate its instructive value and can readily understand why mathematical rules and formulæ do not always meet the exigencies of the case. Steel sometimes refuses to be forced into a straight-jacket of mathematical rules.

One of the very first principles, then, of testing is to take a piece sufficiently large and of a form which insures the free flow of the molecules in that portion of the test piece which is to give the results of the test. The larger the test piece the better, full sized plates, beams, &c., being the best. But time and cost render the adoption of such a course simply impossible. Happily for the engineer, it has been found that for all practical every day work a test piece of comparatively moderate size will answer the purpose imposed upon us by the nature of the metal. Thus a test piece with a sectional area of $\frac{1}{4}$ square inch, and at least 9 inches long in that portion where the piece is expected to break, will answer practical requirements, though it cannot be denied that a sectional area of 1 square inch, with a 10-inch length between datum marks and 12 inches of free metal between grips, would be still better.

their surrounding associates, and a higher strength is the result, while the elongation is also high, because in a short section we get only the elongation at the point of rupture, which represents to us only the stretch taking place after the maximum load has been reached, but does not give us any or but very little of the stretch in that portion of the metal lying outside the contracted area of the fracture, which would be the most valuable to know. The so-called groove section is a most forcible illustration, in the results obtained, of the truth of the foregoing explanation.

It is obvious that tests made with different sections cannot be comparable. Moreover, a manufacturer supplying consumers, each of whom sets up a different standard of quality for the same metal, intended for the same purpose, is thus prevented from working toward the greatest attainable uniformity of his product. Referring back to the imaginary quality line A F, in which A represents the best metal obtainable under the specifications applying to the same, we can easily imagine a case or cases where a consumer has set up for himself, for want of better knowledge, a standard of quality which is just a little below F or that point which is the least allowable point of suitability for the consumer of a material covered by A F. Now, the consumer of G, as we might

call him, may be a large buyer, so much so that the manufacturer finds it to his interest to "work" on the line D F of the one consumer and G on the other. Thus, owing to diversity of opinion and practice as to the value of a measure of quality, two engineers get a somewhat inferior metal, while if they had agreed on the standard which gave them the metal A they would have received better metal for the same price as paid for F G, and of greater uniformity. At the same time it would have been more satisfactory to the manufacturer, who would have been able to simplify his practice and possibly lower the price of metal A.

There is no doubt of the existence of variations in the qualities of a material which still meets the specifications. This is one factor where want of uniformity in method of testing militates against the best interests of every consumer, without benefiting the manufacturer. The accompanying diagram will serve to illustrate the influence of the length of test sections on the results of test. The diagram was prepared, as a result of many tests, by Mr. R. Gatewood, late of the United States Navy, while inspecting the steel for the hulls and boilers of the cruisers "Dolphin," "Atlanta," "Boston" and "Chicago."

We thus have a very instructive illustration of the varying value of test sections. Hence the results of tests made with any one of these sections are not comparable with the results obtained with another section.

No engineer can at the present day cover the entire field of engineering, not even in its most nearly related branches. As a consequence an exchange of opinion and experience becomes indispensable. Such an exchange, however, must be more or less misleading if different engineers base their experience of the same metal on varying measures of quality. Moreover, there being a margin allowed in all specifications, this margin represents varying degrees of qualities within a given specification, as already stated. The extremes of these margins blend into each other, as it were, whenever there are specifications based on different test sections. This diversity is an unknown quantity, and cannot but tend to confusion and false conclusions when judging the influence of service (work) on a metal. The value of the exchange of opinions and experiences between engineers is thus very much impaired and largely stripped of its usefulness. Thus the scientific and economic gain to the engineer would be considerable if there were uniformity of test section and specifications.

The annual trade returns of the Dominion of Canada for 1893, just issued, show a volume of foreign trade \$6,270,000 in excess of that of 1892, which was then the highest on record. The value of the imports into Canada last year was \$129,074,268, and that of exports \$118,564,352. The trade with the United States in 1893 amounted to \$108,984,978 in value, as compared with \$102,957,064 in the year 1892.

The project for a ship canal from Lake Superior to the Mississippi is receiving enthusiastic support in the Northwestern States. The scheme would, it is believed, prove a great benefit to the whole business of the West. Government engineers pronounce the plan perfectly practicable,

and an appropriation of \$10,000 will be asked for to determine the most feasible route.

The British Dockyard at Bermuda.

The natural and almost impassable reefs and the practically impregnable fortresses of Bermuda, the station of the British North Atlantic Squadron, convince the visitor of the foresight of our English cousins in the improvement of this, one of their smallest but most important possessions. Every American with even a modest degree of mechanical interest is sure shortly after his arrival to apply for a pass to the dockyard at Ireland Island and to see for himself the reputed facilities for repairs in this important naval station.

The yard itself is situated in a commanding position, apparently impregnable fortified against assault by land from the other islands of the Bermudian group, while the guard which the fortresses of St. George's maintain over the sole available channel through the reefs would appear sufficient to protect it from successful attack from the water side. Grassy Bay, adjacent to the yard, furnishes excellent anchorage for all the vessels that may enter.

A general tour of the shops of the yard and of some of the vessels undergoing repairs may be made by the visitor, and he will doubtless note the difference between the methods and equipment employed by the English and the Americans. The shops themselves, in which are now employed some 500 men, are neatly and substantially constructed of the coral rock of the island, well lighted by ample windows, and, as might be expected in buildings under Government control, are clean and well kept within.

Rough cobble stone floors contrast strangely with some of our own modern floors in one story structures—for such are mostly the buildings here—devoted to the truly mechanical portion of the work. The extreme moderation in speed of shafting, and, in fact, of some of the tools, rather incline us to give something a push to hurry it up, and this inclination is intensified when we reach the engine room and find there an old style beam engine, with cylinder some 24 x 42 inches, running at the snail like rate of 16 revolutions per minute under 45 pounds of steam and 27 inches vacuum. The beam above, actuated at one end from its cylinder end, transmits the power downward at the other end to a crank and thence from the crank shaft through bevel gears to the jack shaft.

A foundry of small dimensions with three cupolas, designed for a continuous heat and moderately heavy castings, has its capacity in weight of a single casting best proclaimed by the inscription on the traveling crane above, which is limited to 8 tons. The plate shop is fitted for handling only plates of moderate dimensions, and is fairly well equipped with rolls, shears and punches. A systematic record of machine tools is evident from the numbers painted upon them.

In the smith shops is to be seen only a single steam hammer, and that of very moderate size. Heavy plate iron forges are in use, receiving blast from a somewhat ponderous fan blower of Lloyd's patent, all provided with extensive hoods and connections with the wall chimneys.

No machine tools of extraordinary size are to be found and we are unable to learn the exact dimensions of some of

those in use, for our guide either does not or will not know and we are not permitted to measure them. We estimate the largest planer, however, to be about 5½ x 5½ feet, and the largest lathes to have capacity at the gap to turn about 6 feet diameter and to receive a shaft about 30 feet long. Of course all tools are of English make, and, while the equipment is reasonably comprehensive in its character, we are somewhat surprised to find its capacity so limited, particularly as regards the size and weight of pieces that may be handled. But it is a repair, rather than a construction, yard, and, after all, the run across to the English home yards is not a long one if large and important repairs are necessary.

The visit to the dockyard is incomplete without an inspection of the massive floating dock. This ponderous structure, 381 feet in length, 124 feet in width and 74 feet deep, was built at Sheerness in 1868 and towed across the Atlantic to its present resting place, where it forms a very important feature in the equipment of this station. The inner and outer side shells of plate iron are rigidly braced and connected by plate and angle irons, the former serving to divide the entire structure into 48 water tight compartments. Eight steam pumps, four upon either side, are so arranged in connection with these compartments that by admission or removal of water the dock may be raised, sunk or leveled, as may be required.

Vessels of moderate size are simply floated into the dock when partially submerged, and subsequently raised to the desired level by removing the water from within the compartment dock and thereby increasing its buoyancy. The larger craft, however, require the use of end caissons, which are calked tight and the water then removed by pumping from the interior of the dock.

The dock itself weighs about 8200 tons, draws 11 feet of water when light and 50 feet when sunk. It is well located and protected in the inner harbor and stands out in great prominence as one views the yard from a distance.

Just now we find at the yard the "Magicienne" undergoing repairs, the "Shah," now out of commission, the old, but still forbidding looking "Terror," and, looming above everything in the outer harbor, the old "Irresistible." Shortly the scene will be greatly changed by the arrival of the "Blake" and her sister ships of the squadron.

Interest attaches to the "Scorpion" and the "Viper," moored here at the dock, where they have been for years and are likely to remain. They were constructed on the Clyde for the Confederate Government during the war of the Rebellion, but were completed too late for active service. England now holds them in possession, but they seldom or ever leave the dock and then only for a very short run. Somewhat on the monitor type, they are each fitted with a heavy revolving turret and two guns forward.

Our stay in the yard is limited as to time, and we are unable to see and learn all that we desire; in fact, we appreciate that there is much that neither we nor any other Americans may be allowed to see, and this unsatisfied curiosity only serves to give us greater respect for this stronghold of the British Empire.

Owing to the springlike weather which has prevailed of late, navigation on the lakes is reported as being already fully open.

The Marine Boiler Steel Test.

The Board of Supervising Inspectors have at length changed the rules under which the old form of test piece of boiler material is changed, so that it applies now to iron. For steel the following is now provided:

To ascertain the tensile strength and other qualities of steel plate, there shall be taken from each sheet to be used in shell or other parts of boiler which are subject to tensile strain, a test piece prepared in form according to a diagram which shows a center part 1 inch wide, connected by 2½-inch shoulders to ends, 6 inches long and approximately 2 inches wide. The length of straight part in center varies, as called for by different thickness of material, as follows:

The straight portion shall be in length at least eight times the width multiplied by the thickness of said part, and have a reduction of area as called for by the present rules of the board, and an elongation of at least 25 per cent. The straight part shall be of a width of 1 inch. This rule to take effect on and after July 1, 1894.

Provided, however, that where contracts for boilers for ocean going steamers require a test of material in compliance with the British Board of Trade, British Lloyd's, or Bureau Veritas rules for testing, the inspectors shall make the tests in compliance with the following rules:

Steel plates shall in all cases have an ultimate elongation not less than 20 per cent. in a length of 8 inches. It is to be capable of being bent to a curve of which the inner radius is not greater than one and a half times the thickness of the plates after having been heated uniformly to a low cherry red, and quenched in water of 82° F. Such tests to be made at the place of manufacture of the material, by a local or assistant inspector of the district in which such material is to be used, whenever possible. If, however, from distance or other sufficient reason, the inspectors of the district are unable to make such tests, the Supervising Inspector-General may direct a local or assistant inspector from another district to make them. In every case, however, the inspector making the tests shall stamp the initials of his name above the manufacturer's stamp on the plates, and also the letters "U. S. I." with the initials or abbreviated signs of the name of the port to which the inspector making the tests belongs.*

All sample pieces of [steel or] iron plate $\frac{1}{8}$ inch thick and under shall be 1 inch wide at reduced section; plate over $\frac{1}{8}$ inch thick shall be reduced in width at center to an aggregate area approximating $\frac{1}{4}$ square inch, but such reduced area shall in no case exceed $\frac{1}{16}$ nor be less than $\frac{1}{32}$ inch, and the force at which the piece can be parted in the direction of the fiber or grain [when of iron] represented in pounds avoirdupois in proportion to the ratio of its area, shall be deemed the tensile strength per square inch of the plate from which the sample was taken; and should the tensile strength ascertained by the test equal that marked on the plates from which the test pieces were taken, the plates must be allowed to be used in the construction of marine boilers.

* The above provision was added at the extra meeting of the board, held in May, 1893.

Industrial Conditions in Mexico.

John Birkinbine of Philadelphia has an article under this heading in the *Engineering Magazine*. The population of Mexico is placed at 11,600,000 on 767,206 square miles, or 15 per square mile. But the 11 central States, with only 18 per cent. of area, are inhabited by nearly 50 per cent. of the population. A circle centering in the City of Mexico, with a radius of 200 miles, taking in Vera Cruz and Acapulco, would embrace a population of fully 5,000,000.

The *Two Republics*, an English newspaper published in the City of Mexico, is quoted as saying: "It is officially announced that the average daily wages in this country is 27 cents. This is probably at least 10 cents more than it was 20 years ago." "The cents referred to," says the *Railroad Gazette*, "are centavos, or hundredths of the Mexican silver dollar, which would make the average wages about 18 cents in United States currency. This sum is rather small as compared with other estimates, but if work for 300 days is allowed at the rate mentioned it may be correct. In this connection it is of interest to note that the invoice value of goods imported into Mexico for the fiscal year 1889-90, the last year for which returns are at hand, was \$52,018,658. This would give about \$4.48 per capita, which seems a very large proportion of such earnings. The very low wages which are undoubtedly paid in Mexico abundantly testify the retention of the primitive methods of doing work mentioned by Mr. Birkinbine, and the absence of labor-saving machinery in many large enterprises. As a matter of fact, intending investors might advantageously call in 'another man' when they are proposing to put money into a Mexican enterprise which is to be made successful by the introduction of costly or heavy machinery.

"The total cost of the 6389 miles of railroad in Mexico is given as \$200,000,000, of which \$76,000,000 was advanced by the Government. Mr. Birkinbine gives a very instructive set of profiles of six railroads which start from either the Gulf of Mexico or the Rio Grande and reach the central tableland, and also a profile of the road from Nogales to Guaymas, on the Gulf of California. These are all contained in a space of 4 x 7 inches, and they cover more information than could be conveyed by many pages of text. These profiles, with a knowledge of the position of ores, coal, wood and water, give one a key to the industrial possibilities of the larger part of Mexico. The economics of that part of Mexico south of the city of Mexico, nearly all of which, except a portion of Yucatan, is almost a *terra incognita*, is not touched upon, as there are no industries there except in Yucatan.

"The principal investors in Mexican enterprises are Americans and Englishmen. The Germans, French and Spanish are generally storekeepers, and are apt to take their earnings out of the country whenever a rise in the price of silver renders it profitable to do so. The development of the country has been made by the investment of American and British money. The first railroad, from Vera Cruz to Mexico, was built by English money. The Mexican Central, the Mexican National and the Sonora railroads were commenced about 1880, chiefly with American capital and under American control. The Hon. John Bigelow's article, 'The Railroad Invasion of Mexico,' in *Harper's Maga-*

zine, which was published in the summer of 1882, developed a distrust of Mexican investments, and our people unloaded on the English, with the result that the management of the Mexican National passed entirely into their hands and the Mexican Central has since been largely influenced if not controlled by them. Since that the Mexican International, Eagle Pass to Durango, has been built by American capital, while the Interoceanic, Monterey & Mexican Gulf and the Oaxaca Railroad have been built and are controlled by British capital, which thought at one time to dominate the country. But lately much more American than British capital has been entering Mexico. The following table shows the number of companies reported as organized in the two countries, with their capital, for operation in Mexico:

Year.	United States.—		United Kingdom.	
	Number of companies.	Capital.	Number of companies.	Capital.
1890.....	31	\$168,850,000	41	\$56,000,464
1891.....	38	70,535,000	20	18,486,416
1892.....	50	91,635,000	9	10,736,000
1893.....	30	34,580,000	15	4,220,097
	149	\$365,545,000	85	\$89,502,977

"Between the increased facilities for transportation and the larger investments of American money our exports to Mexico have more than quadrupled. For the fiscal year 1879-80 our total exports to Mexico, as shown by the report of the Bureau of Statistics, were valued at \$7,209,593, while for the fiscal year 1889-90 the Mexican Custom House returns show an importation for this country with an invoice value of \$29,080,276, or 55.92 per cent. of the total imports. The British follow us with \$8,535,370, or 16.40 per cent. So that these two countries, which furnish Mexico with the greater part of their industrial capital, also furnish her inhabitants with nearly three-quarters of their foreign merchandise. We are also the two countries which, more than any others, control the means of transportation to that country."

Rates on Iron Articles to St. Paul.

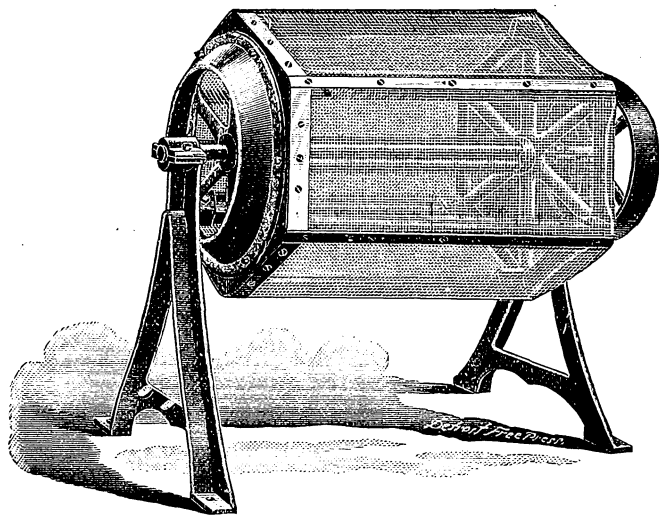
A short time ago Chairman Midgley of the Western Freight Association gave notice that a rate of 13 cents per 100 pounds on iron articles would be made from St. Louis and East St. Louis to St. Paul and Minneapolis, a corresponding rate, or 12½ cents, being made from Chicago. Afterward, by a majority vote, the same rates were made on the following iron articles: Bar, band, boiler, rods, bolts, nuts, axles, plates, hoops, malleable castings, wagon skeins, plow points and wings, plow wheels, steel teeth (harrow or rake), plow beams (iron or steel), wrought or cast iron pipe, horseshoes, and fence wire in straight carloads, minimum weight 40,000 pounds. Representation has since been made that in view of this reduction it will be necessary for the rate clerks to meet and check rates to territory where a combination of locals would reduce existing rates. The rates to St. Paul and Minneapolis will become effective April 2.

The Swarts Iron & Metal Company, 551 to 557 State street, Chicago, have purchased the famous iron exhibit of Stumm Bros., which was the prominent feature of the German section in the Mises and Mining Building at the Columbian Exposition. It was installed at an expense of about \$75,000, con-

tained specimens of the numerous kinds, sizes and grades of iron manufactured by Stumm Bros., required almost a year to be wrought into the artistic form in which the exhibit was made, and required about 900,000 pounds of iron. At the close of the exposition the exhibit was presented to the Columbian Museum, as the expense of reconveying it to Germany was greater than the value of the iron. It was, however, found too bulky for the use of the museum, whose managers arranged with the authorities at Washington for its sale and the use of the proceeds in the interest of the museum. The price paid for the exhibit was about \$3000, and most of it will be consigned to the scrap heap. It is an ignominious end for such a magnificent specimen of ingenuity in shaping coarse products into an attractive exhibit.

A New Sand Sifter

The Detroit Foundry Equipment Company of Detroit, Mich., and Chicago, Ill., recently placed on the mar-



A NEW SAND SIFTER

ket the sand sifter here shown. It is of the revolving type, having a funnel at one end into which the sand is shoveled, and being slightly enlarged at the other end to allow the gravel and dirt to work itself out free of the sand. It differs from the ordinary radial machine, as it is provided with inside revolving radial screens of a larger mesh than the outside screen, and which thoroughly break up and pulverize the sand before it has an opportunity of falling through the outside screen. This type of screen has been in use for some time in several foundries in Detroit and elsewhere and has been found of special value in mixing up sand for facing, &c., also in mixing core sand. The screen is made so that it may be set on brackets or be suspended in hangers from above, and is suitably provided with pulley, &c., complete, ready to set up. It can be made of any length or fitted with any size screen suitable for the work to be performed.

The regular monthly meeting of the Association of Iron and Steel Sheet Manufacturers was held in the *Times* Building, Pittsburgh, last week. Only

routine business was transacted. The condition of the sheet trade at this time was reported to be very much depressed. None of the mills are working full time, while prices are very much lower than ever before in the history of the trade.

Treasury Decisions.

Drawback on Spikes Manufactured from Imported Old Iron Rails.

TREASURY DEPARTMENT, Jan. 31, 1894.

SIR: The Department is in receipt of your letter of the 13th instant, further in relation to certain entries (Nos. 1031, 1031½ and 1031¾) filed by J. B. Vandegrift & Co. for drawback on spikes manufactured from imported old iron rails.

It appears that, although the special regulation prescribed for the ascertainment of drawback on such spikes (Synopsis 7492) provides that the quantity of the imported material used shall be ascertained by adding to the net weight of the imported spikes 20 per cent. of such net weight, the exporters computed the quantity so used by adding to

the net weight of the spikes only 16 per cent., and that the quantity so computed is formally confirmed by the manufacturer's statement on each entry that the merchandise (spikes) was manufactured from materials imported, &c., "as in said entry stated." You inquire "what steps to take in this case."

In reply the Department has to inform you that in the case of spikes, as in all other cases where the quantity of materials used is to be ascertained by an addition of a given percentage to the net weight of the manufactured articles entered for export, the quantity so ascertained is the maximum allowance which may be made, and that there is nothing in the law or regulations to prevent a less allowance, whenever the quantity used, as stated by the exporter and manufacturer, is below such maximum. You will, therefore, liquidate the entries in question on the basis of the quantities of the materials used as therein stated.

It may be proper here to state for your further information that the addition of 20 per cent. to the net weight of spikes, as authorized in Synopsis 7492, is calculated to cover an actual wastage of 16½ per cent.

New Publications.

PROCEEDINGS OF THE INTERNATIONAL ENGINEERING CONGRESS, DIVISION OF MARINE AND NAVAL ENGINEERING AND NAVAL ARCHITECTURE. Edited by George W. Melville, U. S. Navy. Vol. II. Published by John Wiley & Sons, New York. Price \$10.

While the other branches of engineering had their divisions in the International Congress in the charge of the great national societies, the naval architects did not possess an organization capable of publishing their matter in the same way. John Wiley & Sons therefore undertook it, and have recently issued the second volume, which contains the papers by Charles Ward on "Coil Boilers," David Smith on "The Necessity of a Standard Indicator," Prof. W. F. Durand on "The Planning and Equipment of Modern Ship and Engine Building Plants," Archibald Rogers on "The Development of the Ice Yacht on the Hudson," James Weir on "Steam Boiler Feeding," Archibald Denny on "Speed Prediction and Progressive Trials," W. D. Weaver on "Speed Trials and Apparatus," Rodolfo Poli on "The Coasting Sailing Ships of the Adriatic Sea," Edwin S. Cramp on "Steel Castings as Used in Marine Machinery," James E. Howard on "The Form and Treatment of Tensile Specimens," Walter Miller on "Shipbuilding and Engineering on the Great Lakes," John M. Sweeney on "The Construction of Steamboats for Western Rivers," E. Platt Stratton on "Government Inspection of Merchant Steamers," Nelson Foley on "Rules Governing the Construction of Steam Boilers" and on "Forced Combustion in Steam Boilers," Henry Benbow on "The Effect of Forced Draft on Marine Boiler Tubes," Nathan P. Towne on "Marine Engine Valve Motion," and Sydney W. Barnaby on "The Screw Propeller."

A number of the papers quoted have appeared in part and in whole in some of the engineering journals, but in none of them, we believe, are the discussions available, which are in some instances very valuable. The majority of the papers are liberally illustrated and a few of them profusely so. Our enumeration of the papers will show that many engineers not directly interested in naval work will find matter very valuable to them in the proceedings.

THE NUMBERS which deal with the mechanical part of the World's Fair have been published by the Bancroft Company at Chicago as a part of their work, "The Book of the Fair." The illustrations are very numerous and exceedingly well engraved and printed.

Electric Tempering.—According to the "Elec. Tech.," January 31, the Lagrange & Hoho system has been used with great success for tempering certain objects; the bearing part of a shaft, for instance, was tempered glass, hard to a depth of about ¼ inch, while the interior was retained quite soft; with flat springs and files the trials were not a success, files, for instance, heating much more at the points than at the larger parts, and in thin springs the heating was unequal; in a gun factory at St. Etienne very good results were obtained, one man being able to temper 2400 steel wire springs daily; unsuccessful results are reported from Kalk.

The Finished Iron Market of Canada.

Plates, Sheets and Bands.

The result of the last meeting of the wire manufacturers is that wire, in lots of 1000 pounds or more, will be delivered free to purchasers in Quebec and Ontario, at the prices recently quoted for deliveries f.o.b. at Montreal or Toronto.

Excepting rails, plates and sheets form the most important portion of Canada's iron and steel imports, amounting, in the fiscal year 1892, exclusive of bridge plate, to nearly one-eighth of the value of all the weighable iron and steel articles imported, which proportion would be increased to over one-fourth if tin plates were included with the sheet iron. In the fiscal year 1893 there was an increase in the imports of sheet iron, but a decrease in tin plates. The following table shows the imports of plates and sheets proper in the last two fiscal years :

Description.	Duty.	From	1892.		1893.	
			Short tons.	Value.	Short tons.	Value.
Boiler and other plate iron, skelp iron and sheet iron, common or black, not thinner than No. 20, n.e.s. including nail plate of iron or steel of No. 16 gauge or thicker.....	\$13 per short ton....	{ Great Britain Belgium..... France..... Germany..... United States	2,130 8 162	\$67,654 341 8,960	2,110 4 79 148	\$63,895 150 2,205 8,398
Sheet iron, common or black, smoothed or polished, coated or galvanized, thinner than No. 20, Canada plates and plates of iron or steel not less than 30 inches wide and not less than ¼ inch thick.....	12½ per cent. ..	{ Great Britain Belgium..... France..... Germany..... Russia..... United States	17,413 34 110 17 665	642,732 934 3,534 2,258 49,828	19,498 59 7½ 12 9 1,149	755,679 1,718 18 291 1,045 33,211

The imports of tin plates in 1892 amounted to 19,296 short tons, valued at \$1,235,961, and in 1893 to 15,131 tons, valued at \$892,106. Tin plates are admitted free. Terne plates are dutiable at 12½ per cent., but the imports returned under that head are small, being only 213 tons in 1892 and 748 tons in 1893. Although none of the articles mentioned in the table, except nail plate, is manufactured in Canada, yet the heavy duty of \$13 per short ton is imposed on plate and sheet iron not thinner than No. 20 wire gauge, as well as on nail plate proper. This ingeniously protects the cut nail manufacturer against the home competition of any individual who might wish to set up a few nail machines and import cheap plate of dimensions suitable for cutting up into the sizes of nails most commonly used. The ordinary dimensions of boiler plate, on the other hand, permit of its importation at 12½ per cent. duty under the provisions in the sheet iron paragraph.

The importations of hoop, band or scroll iron, 8 inches or less in width, was an important item in the imports of 1892, but the quantity brought in in 1893 was very much less. The duty on this class of material when not thinner than No. 20 is \$13 per ton, which protects the hoop and band mills at Hamilton. Hoops and bands thinner than No. 20 are admitted at the same ad valorem duty as sheet iron of similar gauge, namely, 12½ per cent. The quantity imported under both classifications in 1892 was 4600 short tons, valued at \$143,853, and in 1893 the

total quantity was 2110 tons, valued at \$77,148. In both years a much greater quantity paid the specific than the ad valorem duty, but the falling off in 1893 was chiefly in the heavier and cheaper material, of which Great Britain supplies the larger part. The imports from the United States decreased in the cheaper and increased in the dearer class, so that the tonnage from that country in 1893 was the same as in 1892, namely, 279 short tons, valued at \$14,301 in 1892 and \$14,328 in 1893. Great Britain, therefore, sustained the whole loss from the decreased total importation of hoops and bands, as none were obtained from other countries.

As an indication of the trend of prices in the articles referred to in the foregoing paragraphs, the following statement is presented showing the open quotations for wholesale lots per 100 pounds f.o.b. at Montreal :

Black sheet iron, up to 20 gauge.....	\$2.40
Black sheet iron, No. 24.....	2.20
Black sheet iron, No. 26.....	2.30
Black sheet iron, No. 28.....	2.40
Canada plates (stove pipe iron),	*\$2.25 to 2.45

steel boiler plate, not under ¼ inch thick, is \$2 per 100 pounds. But long contracts are made for boiler plate of the highest quality, accompanied by inspectors' certificates of tests, at \$1.75 laid down at Montreal, freight and duty paid. As the duty is 12½ per cent., it will be seen that with low ocean freight rates the price in Britain would have to be under \$1.50.

The Rusting of Iron and Steel.

The phenomena of chemical combination appear to be exceedingly complex. Not so very many years ago we were taught that a mixture of oxygen and hydrogen would combine to form water when an electric spark was passed through them. The matter appeared simple, was easily expressed in chemical formulæ, and illustrated by experiment. Now we have learned that it is impossible to make such a mixture explode when it consists of perfectly pure and dry gases. When, however, the slightest trace of moisture is present, the combination takes place at once, thus illustrating the importance of those "next-to-nothings" which were so ably and so pleasantly discussed by Sir Frederick Bramwell in his address to the British Association. The oxidation of iron, though a more familiar phenomenon, is at least as complex as that of hydrogen. In spite of the proverb, this familiarity has been very far from breeding contempt, as its commercial importance has attracted very considerable attention to the subject, and though there is still much to be learned, some few facts appear to be now established. In the first place, neither bright iron nor steel will rust in pure water or in pure air. The presence of carbonic acid, or some similar agent, seems necessary, although the final product may be destitute of carbon. Even when oxygen, moisture, and carbonic acid are all present, rusting will not, it appears, take place unless the moisture condenses on the surface of the metal. When rusting does take place under ordinary circumstances, the first stage appears to be the formation of ferrous carbonate. This carbonate is then dissolved in carbonic acid water to form ferrous bicarbonate, which latter is then decomposed in presence of air and moisture to form hydrated ferric oxide, magnetic oxide being formed as an intermediate product. This fact as to the formation of the magnetic oxide is curious, as the Bower-Barff process of protecting iron and steel consists in coating the metal with a firmly adherent layer of this very oxide.

Every one knows that when a bar of iron has commenced to rust the corrosion proceeds apace. A polished bar will resist oxidation for a comparatively long time, even under somewhat unfavorable conditions, but once the rust has commenced to form it does not take long for it to cover the whole of the bar. One reason for this may be the fact that the rust is electro-positive to the iron, but it is also partly attributable to the final product, the hydrated ferric oxide being only formed at the end of several intermediate stages of the oxidation, and to its hygroscopic properties, which favor the absorption of moisture from the air. In certain situations, other acids besides carbonic may take part in the corrosion of iron. The metal work in bridges over railways is particularly exposed to fumes, and some engineers consider that in such cases no plates less than ¾ inch thick should be

Galvanized sheets, No. 28.....	4.00 to 6.00
Hoops and bands (imported)...	2.30 to 2.35
Russia sheet iron (genuine).....	9.50 to 10.00
Common tank iron.....	1.50 to 1.65
Steel boiler plate, ¼ inch and up.....	2.00
Steel boiler plate, 3-16 inch.....	2.75

* Per 112 pounds.

Of course in a market like that of Montreal these quotations on imported material are necessarily nominal ones. English black sheets up to No. 20 gauge, it is stated, can be laid down at Montreal, freight and duty (\$13 per short ton) paid, at \$2.12 per 100 pounds. On the lighter gauges the duty is only 12½ per cent. There is not much Russia sheet iron in stock at Montreal, nor does Canada use a great deal of this high priced Muscovite product. The stocks at St. Petersburg are not large at the present time. The price, c.i.f. London, is quoted at £30. 15/. For steel hoops the English quotation at Staffordshire works is £5. 15/. Common tank plate is quoted to-day at £4. 10/, f.o.b. Glasgow, or 98 cents per 100 pounds. With duty at 12½ per cent. and a 10-shilling freight to Montreal, the plate could be laid down in this city in April at \$1.22 per 100 pounds. At these prices it is not surprising that the representative of a large Eastern Pennsylvania plate mill who visited Montreal a short time ago did not succeed in placing orders. Nevertheless, with the recently announced drop in plates at Pittsburgh to 1 cent a pound, there should be a fighting chance for such plates in Ontario against the British article at the prices here quoted.

In the table the opening quotation for

made use of, even in the case of the flooring.

The whole question of the rusting of iron and steel work has been discussed in considerable detail by Thomas Turner in a paper recently read before the South Staffordshire Institute of Iron and Steel Works Managers. It is now pretty generally acknowledged that, so far as ordinary exposure to the weather is concerned, iron is less liable to rust than steel. Unfortunately, however, this capacity for resisting rust seems to be greater in the common irons than in the best qualities, and has been attributed to the phosphorus contained in the former, which seems to have a protective action. When iron and steel are used in conjunction, there is no certainty which will be the more liable to rust. The potential difference of contact between the two is very small, and though in general wrought iron is found to be electro-positive to steel, there seem reasons for believing that this may not be so in all conditions.

W. Denny has instanced a case in which the steel shell plates of a vessel remained clean, while the iron stem plate and rudder forgings were much corroded. The ballast tanks of ships are particularly exposed to rust. Bilge water is an exceptionally powerful corroding agent and several engineers have suggested the use of iron plating in ships in those parts exposed to bilge water, even when the body of the ship is of steel. In steam boilers it is claimed that there is little difference in the behavior of the two metals, and certainly steel boilers, when properly looked after, have been proved to have a long life. Plates thoroughly cleaned from scale are less liable to corrosion than when used just as they come from the rolls, and the Admiralty have accordingly adopted the practice of pickling the plates before being used. In a case of pitting, Mr. John found a particle of black oxide at the bottom of each pit. Experiment shows that this black oxide is strongly electro-positive to the plates.

Cast iron seems in general to last better in sea water than either wrought iron or steel. Trautwine, however, relates that the cast iron cannons of the "Royal George" and the "Royal Edgar," after an immersion of 62 and 133 years respectively, had become quite soft, and were in some cases like plumbago. A very similar experience was noted with the cast iron sluice gates of the Caledonian Canal. Much apparently depends on the quality of the iron. Trautwine recommends white, close-grained cast iron, while Mr. Turner quotes from a British Association report recommending gray iron.

The alloys of iron with nickel, cobalt and chromium appear less liable to rust than ordinary iron, while the presence of manganese appears to render the iron more sensitive to attack by corrosion.

The works of the American Tin Plate Machine & Mfg. Company, at Linfield, Pa., are in full operation, making about 10 tons a day of finished plates. The specialty of the company is the production of continuous roofing plate, made by the Buckman process. The improved automatic continuous machinery at present in use is being duplicated, and the output will shortly be doubled. The company are said to have closed a contract for the entire output of the works for one year from February 1, 1894. The officers of the company are: P. B. Calvert, president;

S. Y. Buckman, vice-president and general manager; and E. B. Smith, secretary and treasurer.

THE WEEK.

The improvement bill designed to give the Cramps room for the necessary enlargement of their shipbuilding establishment appears to be meeting with vexatious delay in its progress through the City Council of Philadelphia. The Cramps are naturally much hampered in their work by the tardiness of the city fathers in the matter, as they have long been ready to begin the extensions and improvements which are rendered absolutely necessary by the growth of their business.

A Scandinavian Industrial Exhibition will be held at Malmö, Sweden, in 1896.

Two hundred tons of Harveyized steel armor plates for the U. S. monitor "Puritan" were shipped on Friday from the Bethlehem Iron Works.

Lake navigation for the 1894 season opens six weeks earlier than has been the case for years. Advices from Cleveland, Ohio, state that most of the fleet of boats have been fitted out. More than a dozen of the heaviest lake carriers left Cleveland port at the close of last week.

The British naval estimates for the year 1894-95, which were issued last week, show that the Government proposes to spend \$83,355,000 on the navy in the next financial year. This is \$15,000,000 more than the amount used in the past year; and it is described as being but a part of a complete programme which is to cover the operations of the British Admiralty for the next five years, the money for which will be voted in five annual installments. During the coming year seven new battle ships of the first class will be built, as well as six second class cruisers, two sloops and 36 torpedo destroyers of a new design. The personnel of the service is to be increased by 6700 men.

Shipments of gold from South Africa in 1893 reached the value of \$26,400,000.

The largest vessel on the lakes was successfully launched at the Wyandotte yards of the Detroit Dry Docks Shipbuilding Company, Detroit, last week. She is 362 feet over all, 42 feet beam and 25 feet in depth. The vessel has been built for a syndicate, and is designed to carry 4000 net tons of cargo.

The total war ship tonnage launched by the most active naval powers in 1893 was: France, 52,188; United States, 40,050; Great Britain, 28,920; and Russia, 17,320.

News comes from Australia of the discovery of some extremely rich gold fields in the colony of Victoria, near the old mining camp of Ballarat.

Liverpool's electric elevated railway, which has been in operation for a year, has proved entirely successful. A five-minute service of trains is maintained, and no mishaps of any kind have occurred. The road is 5 miles long, and cost, including equipment, \$2,650,000.

The New York factory inspectors find that during the year 1893 the proportion of child labor in this State has decreased from 38 per 1000 to 34 per 1000 of operators.

The business situation in Pittsburgh appears to be better than it has of late

been credited to be. The *Commercial Gazette* of that city, in an article on the trade outlook, asserts that about three-fourths of the regular forces are again at work at the iron and steel mills and factories. Among the unemployed, says that journal, 5000 are city contract laborers who are always idle during the winter, but who will be again employed by the middle of April.

Andrew Carnegie's offer to duplicate every dollar contributed for the relief of the poor in Pittsburgh, before March 1, cost him something over \$125,000.

Bids have been called for by the Lighthouse Board for the maintenance of buoys along the New Jersey coast, the contract to be for one year from July 1 next. Bids must be in by April 1.

The Government is finding some difficulty in securing the necessary land on which to build the proposed naval dry dock at Algiers, near New Orleans, La. The landholders owning the desired property are asking such extortionate prices for it that expropriation will probably be resorted to by the Government.

Titles to Iron Lands.

A decision of Government Land Commissioner Lamereux in Washington last week is of great importance to various corporations which have acquired immense holdings of land in the upper peninsula of Michigan. The decision calls into question the title to upward of \$50,000,000 worth of land held by the Portage Lake & Lake Superior Ship Canal Company. The company secured the grant as a bonus for constructing the canal across Keweenaw Point, which they afterward sold to the Government.

The act under which the grant was made expressly excluded any lands classed as mineral. In making their selections, however, the company seem to have ignored this proviso and to have taken lands distinctly classified as mineral. Some 69,000 acres are affected by Commissioner Lamereux's decision. He has recommended to Secretary Smith that suit be instituted to set aside these titles. Holdings of the Michigan Land & Iron Company and other corporations are also being investigated. The titles of most of the iron mines developed in recent years are affected by the prospective contest.

The Moline Elevator Company of Moline, Ill., are pleased with the attention given an article of their manufacture which was shown among the exhibits of the Crescent Steel Company of Pittsburgh at the late World's Fair. It was a hob for cutting large worm wheels. It was 7 inches in diameter and 10 inches in length. A good grade of steel was required in the first place to make a mass of this size which would temper properly, while in the next place great skill was needed to finish the tool. So good was the steel used and so excellently was the tool made that a hob which had been used for cutting 50 wheels showed scarcely any sign of wear.

It is announced that the Baltimore & Ohio Railroad have contracted for the erection of a number of iron bridges for the St. Louis Division. The Keystone Bridge Works of Pittsburgh are credited with receiving the contract.

The Iron Age

New York, Thursday, March 22, 1894.

DAVID WILLIAMS, - - PUBLISHER AND PROPRIETOR.
CHAS. KIRCHHOFF, - - EDITOR.
GEO. W. COPE, - - ASSOCIATE EDITOR, CHICAGO.
RICHARD R. WILLIAMS, - - HARDWARE EDITOR.
JOHN S. KING, - - - BUSINESS MANAGER.

Riveting Pressures

In a recent discussion of the riveting pressures required for bridge and boiler work by members of the Engineers' Club of Philadelphia much valuable information was brought forward. It was shown that only a few years since there was little, if any, demand for machines capable of exerting more than 50,000 or 60,000 pounds pressure, while at present pressures of 150,000 pounds are common, and even 300,000 pounds are sometimes called for. In the case of boiler work the demand for high pressures has been caused by the use of the thicker plates made necessary by the steam pressures now carried. The increase has not been so marked in bridge construction, as the changes have not been so radical.

Reference was made to experiments made by William Sellers & Co. to ascertain the pressures required for driving rivets cold. At 10,000 pounds a $\frac{3}{8}$ -inch rivet swelled and filled the hole without forming a head, and at 20,000 pounds the plates were pinched slightly and the head was formed. The rivet was well set at 30,000 pounds and at 40,000 the plate at the rivet began to stretch, this continuing as the pressure moved to 50,000 and 60,000 pounds. The conclusion could therefore be reached that for cold riveting a pressure of 300,000 pounds would be required per square inch of section of rivet.

The vital importance of having rivets completely fill the holes is now universally recognized. The tendency is for the rivet to upset, first, at the end where the new head is being formed, the flow of the metal through the hole being resisted by friction. Consequently one end of the hole is liable to be more perfectly filled than the other. One member expressed the opinion that it would, therefore, conduce to sound work if straight blanks were used and both heads upset simultaneously at the closing operation.

Hot riveting, with rivets of iron or very soft steel, requires a pressure of about 50 tons per square inch of section of rivet, if the rivet is worked at a bright red heat and is of moderate length or the hole does not exceed three diameters. This pressure is modified to a considerable extent by the nature of the metal and the temperature at which the rivet is driven. A series of tests were made at the Baldwin Locomotive Works to ascertain the best pressures for driving rivets of

various sizes. Six sets of $\frac{9}{16}$ -inch plates were each drilled with holes varying by $\frac{1}{8}$ inch from $\frac{5}{8}$ -inch to $1\frac{1}{4}$ -inch. As to the result, we quote as follows from remarks made by S. M. Vauclain:

In the first set all the rivets were driven with a pressure of 25 tons; in the second, 33 tons; in the third, 50 tons; in the fourth, 66 tons; in the fifth, 75 tons; and in the last, 100 tons. The riveted specimens were then cut in half longitudinally through the rivets, and they showed that when a pressure of 33 tons had been applied, the metal under and around the two heads of the $\frac{5}{8}$ -inch rivet was indented or compressed; where 50 tons had been used, both the $\frac{5}{8}$ and $\frac{3}{4}$ inch rivets showed the same effect, and so on up to 100 tons, which caused an indentation more or less perceptible under all the heads except those of the $1\frac{1}{4}$ -inch rivet.

In another case a set of plates was taken and treated in a similar manner, except that the holes were punched and the pressure graded from 25 tons for the $\frac{5}{8}$ -inch rivet to 100 tons for the $1\frac{1}{4}$. There was no visible indentation in this case, and the rivets all filled the holes, the conclusion being that the suitable pressure for a $\frac{5}{8}$ -inch rivet is 25 tons; for $\frac{3}{4}$ -inch, 33 tons; for $\frac{7}{8}$ -inch, 50 tons; for 1-inch, 66 tons; for $1\frac{1}{8}$ -inch, 75 tons, and for $1\frac{1}{4}$ -inch, 100 tons. These figures, it will be noticed, are in a very convenient shape for practical use. On reducing them to pounds per square inch of rivet section quite a satisfactory agreement between them appears, as in the following table:

Rivet.....	$\frac{5}{8}$ inch.	$\frac{3}{4}$ inch.	$\frac{7}{8}$ inch.
Pounds per sq. inch.....	162,900	149,400	166,300
Rivet.....	1 inch.	$1\frac{1}{8}$ inch.	$1\frac{1}{4}$ inch.
Pounds per sq. inch.....	168,100	150,900	163,000

The average of these is 160,100 pounds per square inch of rivet section, which may be of use in calculating the necessary pressure for rivets of other sizes.

Experiments made at the same works in cold riveting with the same range of pressures showed that the lower pressures would not form a head, while the higher ones indented the plate.

There was diversity of opinion as to the value of the plate closer unless it was handled with extreme care and judgment. If the plates close so as to require only a minimum amount of calking it is not needed. If in the ordinary plate closing riveter the pressure is transferred to the rivet too early, a "washering" is liable to result between the plates, especially if they are thick. Too long a delay deprives the rivet of the full effect of the power of the machine. The quality of the work then depends solely on the operator. R. D. Wood & Co. exhibited at Chicago a machine provided with an automatic device for transferring the plate pressure to the rivet at the proper moment.

The experience of the operator is the only guide as to the proper length of time to hold the pressure on the rivet. The time is not so long with rivets driven at low temperature as it is with those driven at high heats, since the metal sets quicker. The size of the rivet and length of hole also affect this question. The rivet should be held

until it has cooled to such a degree that the spring of the plate will not distort it.

The value of the presence of manganese in a blast furnace mixture for keeping down sulphur is well known and is occasionally taken advantage of. We believe that it is the first time, however, that the reactions which bring about this effect have been utilized to reduce the manganese. The details of the experiments to which we refer are presented elsewhere by A. P. Bjerregaard. The ingenious idea was tested that since manganese beyond a certain minimum is objectionable in foundry iron, a fair means of getting rid of it is to add sulphur to the furnace mixture in the form of iron pyrites. The danger must, of course, be avoided of carrying this addition so far that an undue amount of sulphur enters the pig. Of course it is not claimed that the method experimented with is one capable of wide application, but it is ingenious, and as a kink which may come in handy under exceptional circumstances, it is well worth remembering by furnace-men when they are in danger of trouble through manganiferous brown ores.

The owners of steamships on the lakes have abandoned hope of profitable business this season. They were not able to unite on a plan to maintain carrying charges. The attempt to keep 25 per cent. of the boats out of commission was frustrated. This fell through on account of the refusal to co-operate by the iron mining companies owning large fleets. The prospects now are in favor of a general scramble for cargoes as soon as navigation opens, which will be earlier than usual this year, owing to the remarkable mildness of the weather for the past three weeks. Vessel owners will probably repeat the experience of 1885, when, according to tradition, they earned barely enough to pay for painting hulls.

The South Park Commissioners, who now own the Chicago World's Fair buildings, were evidently greatly surprised at the bids they received for those structures on the 10th inst. From common report, contractors generally were expected to demand a bonus for the removal of the buildings, on the ground that it would cost more to remove them than the material could be sold for. But when the bids were opened, it was found that the buildings were considered of some value. Taking the highest bids on all the buildings, the commissioners would have received \$36,596. This threw a new light on the subject. It was at once believed that if the buildings were worth so much they were worth a great deal more, and the bids were, therefore, incontinently rejected. Efforts will now be made to sell the several structures at private sale, in the hope to realize more. This is a case in

which bidders injured their chances by bidding too high. They should have asked a bonus for removing each building. The Park Commissioners, it will be remembered, have been paid \$200,000 by the World's Fair Commissioners to take the buildings off their hands, and the latter thought they had made a good bargain by getting out of the cost of removing the buildings, which they feared might exceed that amount.

Disorganized Freight Rates.

To the many perplexities of merchants and manufacturers has been added lately a crowning trouble, that growing out of a complete disorganization of freight rates. It is probably not to be wondered at that railroad managers, with a large part of their equipment idle, should endeavor to make up for a dearth of business by attempting to capture more than their share of what business is going by making secret concessions to heavy shippers. If railroads were private enterprises no one would have a right to complain, but since they are public carriers whose duty it is to treat all comers alike, their course is unjust and unfair.

A number of open reductions in rates of freight on crude and finished iron have been made lately in the Central West which confessedly have been preceded by a period of cut rates in favor of certain localities or some favored shippers.

It was only a few weeks since that the protests against secret rates on steel billets from Pittsburgh to Eastern points drew out a lowered open rate, coupled with the statement that an agreement had been made between the leading roads to maintain that rate. And now comes the report that the rate so established has been cut 60 cents, or, to be more specific, that the rate on billets from Pittsburgh to the Philadelphia district is \$1.70 per ton, instead of \$2.30.

If the lowering in freight rates proceeded openly and uniformly so far as competing districts are concerned, there would be little cause for complaint. In fact, it might do some good in stimulating consumption. But unfortunately it does not, and therefore has a frightfully disorganizing effect. Until evidence is secured to convince skeptical railroad managers, merchants and producers in other sections are groping in the dark, and are losing business heavily, which no tardy concessions can recover. Entire producing sections, with the working population dependent upon them, are robbed of their natural outlet. Even the favored manufacturers are hurt, because the trade figures out unduly low prices at works, from the known delivered quotation, by deducting the open freight rate. We have reason to believe that some of the record breaking prices which have come to our notice, but to which we have declined to

give the sanction of publicity, have been arrived at in this manner.

Under the circumstances it behooves those who have charge of the freight departments of railroads serving threatened producing sections to be vigilant, and to promptly protect the shippers of goods originating on their lines.

The announcement that Congressman Tom L. Johnson and A. J. Moxham have decided to build a large new plant at Lorain, Ohio, will be received with interest, particularly since they certainly propose to go into the manufacture of standard steel rails for steam railroads, in which business the Johnson Company have not been engaged thus far. The choice of a lake port as the place of manufacture may have caused some surprise to those who have not observed that the steady lowering in the consumption of fuel per ton of product is crowding the locality of maximum efficiency steadily toward the ore, since the quantity of the latter is fixed. The establishment of a new rail plant is a matter of surprise, because the present mills are more than able to cover our maximum requirements, even when a sanguine view of the future be taken. In the East we have the splendid mill of the Maryland Steel Company now idle, while the Bethlehem Company are to remodel their works completely. Lackawanna has thoroughly shown its capacity to hold its market during the last great struggle. In Western Pennsylvania Cambria have modernized their works, and Duquesne are ready to jump in, should rails prove more profitable than billets. In the West the Illinois Steel Company have splendid modern equipment. If the existing concerns had antiquated machinery, easily beaten in cost of manufacture by any newcomer availing himself of the latest appliances, the building of a new plant might be readily understood. It might be explained, too, if the profits of existing concerns were exceedingly tempting. But taking the good and the bad years, and counting the frequent expenditures for remodeling, the rail manufacturers are not reaping a very startling harvest.

Exasperation is steadily increasing among business men at the endless delays which are keeping the community in suspense concerning the future of the tariff. Week after week is spent in backing and filling, and predictions are growing more positive that the decision will not be reached until the summer heat drives our legislators from Washington. The fact seems to be forgotten by Congressmen that the interests in political questions which are paramount with them play a very subordinate role with the great mass of the people. With them lucrative employment of their labor or their capital is the consideration before which all others fade into insignificance. Americans are a long suffering

people, but they will not indefinitely allow talkers to paralyze the men of action. To the workman who is out of employment or who is struggling along at cut wages and to the business man who is feeling himself drift hopelessly toward insolvency, high political interests have no meaning. They want immediate relief.

OBITUARY.

EDWARD C. SMITH.

Edward C. Smith, a well-known personage in the iron trade of Ohio, died at his residence, Warren, Ohio, on March 9, aged 44 years. Mr. Smith was a man of remarkable physical strength and appearance. About six weeks prior to his death he complained slightly, but was able to attend to his duties. On March 8 he submitted to a surgical operation and died the following day. For several years Mr. Smith was cashier of the Trumbull National Bank, Warren, Ohio. When the New Philadelphia Iron & Steel Company, New Philadelphia, Ohio, were organized in 1885 he became one of the principal stockholders and general manager of the concern, which position he occupied with the exception of a brief interval until his death.

CAMBRIDGE CULBERTSON.

Cambridge Culbertson, of Ironton, Ohio, died of apoplexy. He was 78 years of age. Except for the weakness of advanced age, Mr. Culbertson had been in fairly good health. The deceased was one of the pioneer residents and iron manufacturers of Lawrence County. In past years he was interested in the Lawrence Furnace, in Buffalo Furnace and later had interests in Tennessee. For nearly twenty years, however, he has been retired from active business.

J. J. FRONHEISER.

A cablegram received in Johnstown, Pa., on Tuesday, from Darmstadt, Germany, announced the death there of James J. Fronheiser, who was for many years connected with the Cambria Iron Company. Mr. Fronheiser left his home in good health for Europe about six weeks ago to study the question of the recovery of the by-products in the manufacture of coke. For several years he was the general superintendent of the Cambria Iron Company. Since 1890 he has had charge of the laboratory. The deceased was born in Johnstown, February 14, 1849. His wife and one child were drowned in the great Johnstown flood. Several children, however, survived that disaster.

RICHARD C. HANNAH.

On the night of the 16th inst. Richard C. Hannah died of heart trouble at the Tremont House, Chicago. Mr. Hannah was secretary of the North Chicago Rolling Mill Company for some 20 years, and was secretary and treasurer of the Illinois Steel Company during the first year of the existence of that corporation. He had not been actively engaged in any business since his retirement from that position. He was born in La Porte, Ind., completed his education at Heidelberg, Germany, and during the administration of President Lincoln was United States Consul at Santander, Spain. He was an accomplished linguist and a devoted student, finding his greatest pleasure in his books. Although naturally of a retiring disposition, Mr. Hannah was ex-

ceedingly agreeable in his manners, and perhaps had not an enemy in the world. Mr. Hannah had never been married, and was 58 years old at the time of his death. His remains were interred at La Porte, Ind.

PERSONAL.

Joseph E. Thropp, owner of the Everett Furnace, Everett, Bedford County, Pa., is prominently mentioned in connection with the Congressional nomination in the Twentieth District, comprising Bedford, Blair, Cambria and Somerset counties. Mr. Thropp has the reputation of being one of the ablest exponents of the tariff in Pennsylvania, thus qualifying him to ably represent the interests of the district. He is also prominently identified with the Protective Tariff League, having been a member of the Executive Committee since its formation. Bedford County not having had the privilege of naming a candidate for years gives Mr. Thropp unusually strong claims on the voters of the county.

James C. Hallsted, C.E., has removed from Chicago to Philadelphia and now has charge of the Eastern business of G. W. G. Ferris & Co., with office at 328 Chestnut street. John C. McMynn, M.M.E., has charge of the Western business of the firm, 1137 The Rookery, Chicago.

New Magazine Rifle for the Navy.

A circular has been issued from the Navy Department calling on inventors for designs of breech closure and magazine for the proposed .236 caliber small arms for the Navy and Marine Corps. The Department desires either to buy the arms in a condition ready for use or to obtain the right to make them at the Government plants. All inventions must be submitted to the Naval Small Arms Board at the Torpedo Station on or before August 1. About 7500 rifles will be required for the present use of the naval service. This number is thought sufficient with which to arm the new ships. The old vessels will not get the new arms.

The breech mechanism to be called for in the Department's circular must be suitable for guns of the following characteristics: Caliber, 6 mm. (.2362 inch); rifling six grooves, one turn in 6½ inches; bullet, steel jacketed, 135 grains weight; cartridge, brass; maximum capacity, 40 grains of rifleite; charge, 36 grains. All parts of the mechanism must be designed to withstand a chamber pressure of 60,000 pounds per square inch. Barrels partly ready for breech fittings and ammunition will be supplied by the Navy Department.

The inventions submitted will be subjected to thorough tests to determine their safety and general action, strength, endurance, rapidity and ease of manipulation. These tests will be conducted by a board, composed of Commander Converse, Professor Alger and Ensign D.ffenback of the Navy, and Captain Reed of the Marine Corps.

Eastbound shipments from Chicago are increasing materially. Last week's freight was 3000 tons in advance of the previous one, and 1000 tons more than those of the corresponding week of last year. The manipulation of rates is, however, credited with the increase rather than any particular improvement in market conditions.

Washington News.

(From our Special Correspondent.)

WASHINGTON, D. C., March 20, 1894.

By the time this correspondence reaches the watchful eye of the readers of *The Iron Age*, in matters affecting the vast industrial interests of the country, the House tariff bill, rendered even more objectionable by the Senate Committee on Finance, will be before the country.

In conversation on the subject, Senator Aldrich, who is the most active in actual charge of the minority side of the tariff question as it now presents itself, said to-day: "There seems to be no advantage in delaying the report to the Senate. If we must have a contest on every item in the bill, and then be voted down without reference to the effect the change in duty may have upon the industries concerned, it seems wiser to have the contest made in open Senate, where the people might know what is going on."

There was somewhat of a spurt over the fixing of a time for the consideration to begin. The minority set Monday, April 2, to which the majority objected. It was then proposed to continue the consideration in committee.

When it was found that nothing could be gained the minority plan was accepted, so that the great tariff battle of 1894 will begin on that date.

The greatest event in the history of ordnance manufacture in the United States will take place to-morrow, March 21.

The event has been regarded of sufficient magnitude to justify the invitation of the entire membership of both Houses of Congress, and very large numbers of Senators and Representatives have signified their intention to be present and witness the firing of the first 13-inch breechloading rifled gun manufactured in this country.

There will be four rounds fired from the gun. The 12 ordered are designed for the battleships. It is not probable that any more of this size will be turned out. It is now very generally conceded by American ordnance experts that the limit in the size of the gun for most effective use has been reached.

The following are the complete figures concerning this monster piece of ordnance: Caliber, 13 inches; weight, pounds, 135,900; tons, 60.5; total length, 40 feet; greatest diameter of gun body, 49 inches; total length of bore, 454.46 inches; length of rifled bore, 370.46 inches; grooves number 52; chamber length, 80.88 inches; diameter, 15.5 inches; capacity, 15,059 cubic inches; total capacity of bore, 64,857 cubic inches; travel of projectile, 373.58 inches; weight of charge, service velocity, 590 pounds; weight of projectile, 1100 pounds; ratio of projectile weight to weight of gun, $\frac{1}{125}$; muzzle velocity service, 2160 foot seconds; rendering velocity, 100 yards, 1977 foot seconds; 1500 yards, 1918 foot seconds; 2000 yards, 1860 foot seconds; 2500 yards, 1805 foot seconds; muzzle energy, 336.27 foot tons; thickness of steel which shell will perforate at muzzle, 26.66 inches; the same at 1500 yards, 23.42 inches.

In order to accommodate visiting guests the "Dolphin," "Dispatch" and "Triton" have been under orders for transportation.

The following is the form of invitation:

WASHINGTON, D. C., March 19, 1894.

Admit bearer to Naval Proving Ground, Indian Head, Md., Wednesday, March 21, 1894. Test of 13-inch gun.

Tug "Triton" will leave Washington Navy Yard at 9 o'clock a.m.

In an interesting conversation with Commodore Sampson on the subject of the 13-inch gun, he mentioned a few figures to show its enormous energy. He said: "One of the battle ships weighs 10,000 tons. The energy from one of these guns, if it could be properly applied to the bottom of one of these ships, would lift the whole ship three feet."

The trial of the new Sellers jacket furnace for the assembling of great guns in this trial instance as applied to the nickel gun is now simply waiting for the arrival of Mr. Sellers.

The jacket is put on by the old process at a temperature of 600° F. The two processes are heating the jacket by the product of combustion of petroleum concentrated by means of pipes. The other is by a more direct application of the petroleum.

There has been no material difficulty in the assembling of these guns by the old methods. The new method proposed is therefore simply an experiment.

The official report in the test of the Carnegie plates at Indian Head last week, the results of which were announced in *The Iron Age*, has been received at the Department and referred to the Secretary of the Navy for his personal inspection. Everything in the line of government work, like armor plates, done at the Carnegie works seems to be under a cloud, if nothing more, in departmental circles. All the reports and other details from the inspectors are being closely examined.

Changes in the Metal Schedule.

The tariff bill, as amended by the majority of the Senate Finance Committee and finally laid before the Senate, makes a few changes from the preliminary majority Senate Finance Committee bill, which we noted recently, as compared with the Wilson bill. These last changes are as follows:

All sheets of iron or steel, common or black, excepting as hereinafter provided for, thinner than No. 25 wire gauge, and all iron or steel commercially known as common or black taggers iron or steel, or which have been pickled or cleaned by acid or by any other material or process, or which is cold rolled, smoothed only, not polished, shall pay a duty of three-fourths of one cent per pound, instead of nine-tenths, as reported by the House bill and left by the Senate Committee. The provision of the House bill also stricken out by the previous Senate bill that the reduction provided for as to sheets of iron, or as to steel thinner than No. 25 wire gauge, shall take effect on and after October 1, 1894, has been reincorporated.

Sheets or plates of iron or steel, or taggers iron or steel, coated with tin or lead, or with a mixture of which these metals or either of them is a component part, by the dipping or any other process, and commercially known as tin plates,terne plates and taggers tin, has been reduced from one and one-fifth cents per pound to one cent per pound, and the provision of the House bill that this reduction shall take effect October 1, 1894, which was stricken out, has been restored.

Cast iron pipe of every description increased from 20 per cent. to 22½ per cent.

Cut nails and cut spikes of iron or steel reduced from 25 per cent. to 22½ per cent.

Rivets of iron or steel reduced from 30 per cent. to 25 per cent.

Cross cut saws, mill, pit and drag saws reduced from 25 to 15 per cent.; circular saws, hand, back and all other saws remain at 25 per cent.

Aluminum, in crude form, alloys of all kind in which aluminum is the component material of chief value, reduced from 25 per cent. to 15 per cent.

The Penn Bridge Company, Beaver Falls, Pa., manufacturers of bridges and structural material in iron or steel, have received a contract for the construction of the new buildings for the Pittsburgh Reduction Company, at Niagara Falls, N. Y. These buildings will be of steel throughout and covered with corrugated iron, the Penn Bridge Company being the lowest bidders on the work, their price being \$17,900. The plant will comprise three buildings, consisting of a reduction building, 85 x 95 feet, a manipulating building, 70 x 75 feet, and a stock house, 70 x 100 feet. The reduction building is to be completed by June 1; the other two buildings on June 15. The Penn Bridge Company also have contracts on hand for steel roof trusses, with corrugated iron covering, for the new manufacturing establishment of the Garland Chain Company, at Rankin, Pa.; also the contract for a gas house for the Johnson Company of Johnstown, Pa.; also for a boiler house for the Ohio Steel Company, at Youngstown, Ohio, and in addition a considerable amount of contracts for bridges in different parts of the country, from Pennsylvania to Texas; spans, 50 feet to 100 feet. The Penn Bridge Company are now erecting a bridge at St. Cloud, Minn., three spans of 180 feet, one 60-foot and one 30-foot span; also a bridge across the Brazos River at Richmond, Texas, one span of 200 feet and two spans of 100 feet, and a 150-foot span for the city of Scranton, Pa.

A big order for dynamos and other electrical apparatus has just been received by the Edison General Electric Company, Schenectady, N. Y., from the Pittsburgh Reduction Company. The order calls for four dynamos of 500 horse-power each and five 400 horse-power transformers. It also includes switchboards and other auxiliary apparatus, the entire order making one of the largest ever received. It is understood that this will be succeeded by further contracts for quantities of electrical machinery. There will probably be an increase of employees at the Edison works, as the first of the dynamos must be delivered within five months. The total capacity of the Cataract Construction Company's plant is 50,000 horse-power and 15,000 horse-power is now being installed.

The regular monthly meeting of the Western Foundrymen's Association will occur on Wednesday, March 28, at 7.30 p.m., in rooms 702-703 Temple Court Building, corner of Dearborn and Quincy streets, Chicago, Ill. By request of the association W. J. Keep will present a short and very interesting paper on "Cupola Melting and Strength of Cast Iron."

Forging by Hydraulic Pressure.

In a paper upon hydraulic forging, read by R. H. Tweddell before the Institution of Civil Engineers, the author began by giving a brief history of the development of the hydraulic forging press since the year 1846, when the late Sir Charles Fox proposed the attachment of different tools for the working of hot or cold iron to the tables of the Brahmah press. The author then formulated the following conditions as necessary to be fulfilled to insure success in hydraulic forging: First, the press must be so proportioned as to insure the utmost rigidity, any movement of the main columns, of course, interfering with the correctness of the work; secondly, the crane power must be not only ample, but so arranged that weights reaching to 100 tons could be manipulated by unskilled laborers; thirdly, the details of the construction of such parts as the valves and pumping arrangements must be as perfect as possible. These conditions were discussed *seriatim*, and the author indicated the means by which they were met in the various types of forging presses now made. Proceeding to particular makes of press, the paper gave descriptions of all those at present manufactured in England. This part of the paper concluded with a reference to the 22 cwt. steel ingot exhibited in the 1851 Exhibition by a Sheffield firm, the size of which was then considered quite exceptional; and by quoting Fairbairn's opinion of the value of the steam hammer in building up large masses of iron for the manufacture of large guns and marine engine shafts.

The second part of the paper was devoted to a comparison between the hydraulic forging press and the steam hammer. Starting with the axiom that noise and waste of energy were convertible terms, the author mentioned the points in which there could be no difference of opinion as to the superiority of the press. Its power was practically all exerted upon the forging, and not dissipated in shocks to the framing and foundations; it also occupied much less head room than a hammer, and consequently traveling cranes could be used, passing if necessary over the press. Further, not only could more work be turned out by a press than by a steam hammer in a given time, but it could work through a much greater range, for while the effects of a "blow" shortened the life of any of the dies or tools used, it rendered impracticable the employment of numerous dies and molds which were satisfactory under pressure. The art of forging large masses had made distinct advances since the introduction of hydraulic pressure; for it was formerly impracticable to forge the hollow marine shafts at present used, or to draw out gun tubes or hoops on the mandrel.

It was extremely difficult to draw the line where the tools described ceased to be forging presses and became stamping and welding machines. Here there was more room for discussion as to the merits of forging press *versus* steam hammer, because many interesting questions arose as to the relative effect of a blow or a steady pressure when, for instance, stamping the iron work used in wheel making. The author had preferred to confine himself to the hydraulic forging press proper and to eliminate the mechanical treatment of metals by forging or pressing as a whole. Much thought had been expended in trying to calculate the size of hydraulic

press that would be equal to a steam hammer exerting a given force of blow, but in the opinion of the author the question was not worth pursuing, because until the amount of work done on the forging was equal and done in the same space of time no satisfactory comparison could be made. Owing to the action of the hydraulic press being constantly progressive the tool continued to force its way into the ingot until its resistance to alteration of form was equal to the pressure on the ram or the latter was removed. In this it differed entirely from the action of a hammer, which, having delivered one blow, did no more work until the following one. This constituted the essential difference between the two machines. The effect of the hammer was momentary, and there was not time for the pressure it gave to penetrate the metal, much less to alter its form to any extent at one blow, but in the hydraulic press the same rate of working per hour could be maintained, while the material was allowed every opportunity to flow in the required direction without injury. The effect of hydraulic pressure on forgings was to increase their homogeneity. The blow of a steam hammer was given with least effect when it was most required—that was, it could not get its full stroke until the forging was reduced in size, whereas the press gave its full power at any point in its stroke.

Aluminum Yachts.

Two examples of aluminum-built yachts are at present to be seen in French waters. One is the 10-ton yacht *Vendenessa*, launched last month from the stocks of the Société de Chantiers de la Loire, and now in course of being fitted out for next season. The other is a 33-foot sailing boat, now on exhibition on the Seine. The former craft has been built for the well-known French yachtsman Comte de Chabannes, La Palice, from the designs of M. V. Greilloux. It is computed that if this vessel had been constructed of steel frame and wood planking, like other boats of her class, her hull would have weighed some 4 tons 5 hundred, but in aluminum the weight is only some 2 tons 6 hundred. The other craft referred to is named the *Jules Davoust*, and with it Lieutenant Hourst intends to set out on a survey expedition on the Niger. This craft affords additional proof of the great suitability of aluminum as the structural material for boats intended for exceptional purposes, such as river survey and exploration. The boat complete only weighs 18 hundredweight, a fact which sufficiently indicates the extreme portability of the craft when overland traffic is involved.

The Trenton Iron Company of Trenton, N. J., are completing for the Trinidad Asphalt Company, Trinidad, W. I., a wire rope tramway a little over 2 miles in length, to run about ¼ mile out to sea. They are also building for the sea end of the tramway an iron pier, 900 feet long, from which steamers will load. The tramway will be used for carrying asphalt from the Pitch Lake to vessels at the pier, and will, it is expected, enable the company to load and ship 750 tons of asphalt per day.

A combination of sewing machine manufacturers, with assets of more than \$5,000,000, is reported from Chicago.

Trade Publications.

THE 1894 CATALOGUE of the Jarecki Mfg. Company, Limited, of Erie, Pa., is a large, handsomely illustrated, bound volume of 300 pages. It covers very completely the wide range of cast and malleable iron gas, water and steam fittings, valves, oil cups, water gauges, radiators, screw plates, pipe machines, &c. It also presents all supplies necessary for oil and artesian well work, including drilling tools, engines, boilers, pumps, pipe, &c. The products of this company have been long and most favorably known. Their long experience and the employment of special machinery enable them to guarantee their work, both as regards design and accuracy of workmanship.

THE EYNON-EVANS MFG. COMPANY of Fifteenth and Clearfield streets, Philadelphia, engineers, have just issued a 60-page catalogue of their specialties. The catalogue is well illustrated and the descriptive matter well written. Considerable space is devoted to the Eynon-Korting compound injector, which is started, regulated and stopped with one handle. The construction of the injector is described as being such that the suction and forcing nozzles can be readily taken out, or a wire passed through to dislodge an obstruction by simply removing a plug. Its valves can be reground, and all stuffing boxes screwed up and repacked without dismantling the injector or disconnecting from the piping. The other specialties shown in the catalogue are condensers, combined pump and exhaust condensers, automatic free exhaust valves, vacuum breakers, Eynon-Korting blowers, Cyclone blowers, air compressors and exhausters, syphons and valves. The catalogue is well printed on calendered paper, and bound in stiff paper covers with the company's card embossed on the front page and a cut of the works on the back page.

FROM A CATALOGUE RECEIVED from the Standard Steel Casting Company of Thurlow, Pa., a fair idea can be formed of the massive proportion of some of the work now done in this line. The engravings show the largest gun carriage casting yet furnished for the United States 13-inch guns. This had a tensile strength of 75,100 pounds, elastic limit of 38,000 pounds, an elongation of 25 per cent., and weighed 17,010 pounds. The steel bed plates for triple expansion engines for United States cruisers weighed 12,780 pounds. There are also shown hydraulic cylinder weighing 31,215 pounds; engine housing weighing 5160 pounds; stern post for the "Columbia" weighing 49,520 pounds and stern shaft bearing weighing 67,135 pounds. Under general remarks we find the following: "We make our castings strictly of open hearth steel produced from the best known brands of iron, thereby securing the most satisfactory results. The practical difficulties of making good steel for castings are numerous. In making steel of iron, if too much carbon is used it makes cast iron; if too little, we simply have wrought iron. If the mixture is right and the heat too great, the steel is made useless by burning; if too little, it becomes almost worthless, and each effort thereafter either improves or injures the stock before it is in condition to utilize. Hence the talent employed should be skilled and be men of experienced judgment."

THE BUFFALO STEAM PUMP COMPANY of North Tonawanda, N. Y., have issued a catalogue describing the various types of steam pumping machine built by them. In their duplex pumps, two steam pumps, practically, are placed side by side, and so arranged as to act reciprocally upon the steam valves of each other. The one piston acts to give steam to the other, after which it completes its own stroke and waits for its valve in turn to be acted on before it can renew its motion. The slight pause allows all the water valves to seat quietly and thus prevents anything like harshness of action. As one of the steam valves, by this arrangement, must always be open, there can be no dead point, consequently no jar, and the pump is always ready to start when steam is admitted. The Buffalo steam pumps are compact and substantially built. All working parts are made extra heavy, wrought iron, steel and brass entering largely into their construction. All wearing parts are made interchangeable, so that if through

accident or by reason of wear it becomes necessary to replace any portion of the pump, such worn or broken part can be duplicated at short notice. The duplex pumps built by this company are of the packed piston pattern, except those intended for water works purposes, mining service, or where the nature of the work renders it advisable to use a pump having solid plungers. The water pistons are made of iron and brass, and arranged for suitable elastic fibrous packing. All boiler feed and low service pumps are arranged with removable cast brass linings.

WE HAVE RECEIVED from A. Beard, Cambridge, Ohio, "The Red Book," a publication which he has compiled and issued for the use of sheet iron jobbers, users and manufacturers. The weights of separate sheets, United States standard, all regular sizes from No. 10 to 30 gauge, and areas of sheets are arranged in convenient and concise form, and will be found very useful for estimating tonnage of specifications. Sheet bar sizes are also given in widths from 5 to 8 inches. The thicknesses are graded to 1-32 inch, full or slack. A table for estimating wages of sheet mill tonnage men is also included. "The Red Book" will be found handy for reference by all who find it necessary to figure weights of iron and steel sheets. The price is \$1, postpaid.

CORRESPONDENCE.

Foundry Chemistry.

To the Editor: I have been glad to notice of late the interest which the foundrymen have been recently developing in the application of chemistry as regards their purposes. From the discussion up to date, I think the matter remains in much the same position as at the commencement. Personally I cannot help but think, from some little experience had in this direction, that the idea of, in the course of an indefinite period, getting a general formula, impracticable. To give steel as the product of chemistry and assert that equally as easily the same development of the foundry business can take place, logically may be correct, but the chemist in the first place must not overlook the fact that the product of a charge either put in the open hearth or converter is very nearly purity itself in comparison to the melted iron run into castings, and thus the numerous metalloids that are found in a casting have, in a great measure, to do with the alteration of the casting physically. Granting that a general formula could be made, and that the foundry trade were working on lines similar to the steel manufacturers, it must not be forgotten that to-day it is possible to get chemically the finest steel and yet have it to be practically of no value. In my opinion the main difficulty to be found is to know at what temperature to run the metal, which should entirely be dictated by the size of the castings, as I have found that a bulk of metal cast into sand at different percentages of carbon and different degrees of heat gives physically an entirely different casting.

INTERESTED.

PITTSBURGH, March 20, 1894.

A. Falkenau of 1042 Ridge avenue, Philadelphia, is supplying to the Brazilian Government 15 projectiles for dynamite guns, 8 inches diameter, 8 feet long. He is also supplying 15 projectiles of the same size for the United States Government.

It has been decided to hold the autumn meeting of the British Iron and Steel Institute at Brussels, Belgium, from September 4 to 7. Members of the institute will thus have an oppor-

tunity of visiting the International Exhibition at Antwerp. Visits will also be made, by invitation, to the Cockerill Steel Works, near Liège, and some of the new basic steel works in other parts of Belgium.

Changes in Freight Rates.

The Lake Shore & Michigan Southern Railroad and Pittsburgh & Lake Erie Railroad have issued a joint freight tariff, taking effect March 22, giving rates on pig iron and billets, blooms, &c., in carloads of 12 tons and over, from Pittsburgh and Beaver Falls, Pa., and stations taking same rates, to the following points:

To	Note 1.	Note 2.
Buffalo, N. Y.	\$1.30	\$1.30
Chicago, Ill.	2.00	2.10
Detroit, Mich.	*1.75	†1.80
Cincinnati (Erie)	1.70	1.80
Duluth, Minn.	4.00	4.50
Cleveland (Erie)	1.00	1.00
Erie, Pa.	1.00	1.00
Findlay, Ohio	1.50	1.60
Fort Wayne, Ind.	1.70	1.80
Hammond, Ind.	2.00	2.10
Marquette, Mich.	4.00	4.40
Milwaukee, Wis.	2.40	2.50
Minneapolis, Minn.	4.00	4.50
Muskegon, Mich.	2.00	2.10
Rockford, Ill.	2.75	2.85
St. Paul, Minn.	4.00	4.50
Waukegan, Ill.	2.40	2.50
East St Louis (Erie)	2.25	2.35
Indianapolis	1.90	2.00

*\$1.55 via Erie Railroad.

†\$1.60 via Erie Railroad.

Rates shown under head of Note 1 will apply on pig iron, mill cinder and scale, per gross ton.

Rates shown under head of Note 2 will apply on billets (iron or steel), blooms (iron or steel), borings (iron or steel), chain iron (in coils), crop ends (iron or steel), ingots (iron or steel), muck or puddle bars, old car wheels and axles, old rails, scrap iron, scrap steel, scrap tin, slabs, unfinished (iron or steel), wire rods (in coils), per gross ton; cast iron pipe and ingot molds, per net ton.

The rates to St. Paul, Minneapolis, Minnesota Transfer, Duluth and West Duluth, Minn., Superior and West Superior, Wis., via Chicago, on finished iron and steel, will be 23½ cents per 100 pounds in carloads, and 30 cents per 100 pounds when in smaller quantity than a carload.

The rate from the Pittsburgh district on finished iron and steel to Chicago is 11 cents for carloads and 15 cents for less than carloads, to Detroit 8 and 11 cents respectively, to Louisville, Ky., 12 and 16 cents.

The new rates on billets and finished material to Eastern points are printed under the Pittsburgh report.

Freights on pig iron to Eastern points from the Mahoning Valley have been reduced 50 cents per ton.

It is reported that a contract for building and equipping about 100 miles of electric road for the Nassau Electric Railroad Company, in Brooklyn, has been signed. The work will be done by the Johnson Steel Company, of Johnstown, Pa., and the equipment furnished by the Thomson-Houston and Westinghouse electric companies. The total cost will, it is said, amount to \$12,000,000.

Fall River dispatches intimate that the mills in that district are busy and not unprofitably employed.

MANUFACTURING.

Iron and Steel.

The puddlers in the employ of the Clinton Iron & Steel Company, at Pittsburgh, have gone out on strike against a 10 per cent. reduction in wages. For some time past puddling at this plant has been done at \$3.60 per ton, while the wages of the finishers were also reduced about 25 per cent. at the first of the year. The men state that if they would accept the last proposed reduction of 10 per cent. it would bring the price of puddling down to \$3.24 per ton, and they state they will remain idle in preference to working for that figure.

Last week the output at the plant of the Pennsylvania Steel Company, Steelton, Pa., was considerably larger than for any one week during this year.

The Monongahela Iron & Steel Company, Pittsburgh, manufacturers of high grade muck bars exclusively, are operating their plant under agreements made with their employees on October 20, 1893, and March 2 of this year, and as some of the men refuse to continue working under the above agreements, they are being replaced with new men as fast as possible. This concern have a special patented process for the manufacture of muck bars, wages not being controlled by any labor organization.

Last week ground was broken at the Homestead Steel Works, Homestead, Pa., for the new blooming mill, contract for which has been placed with Mackintosh, Hemphill & Company of Pittsburgh. This new mill will be a 28-inch mill, and takes the place of a blooming mill built many years ago at this plant, when it was operated by the Allegheny Bessemer Steel Company. At the Duquesne Steel Works, a 38 inch blooming mill is to be erected to replace the present 32 inch mill. The engine for the new mill will be 42 x 60, while the one now in use is 28 x 48. This mill and engine will also be built by Mackintosh, Hemphill & Company.

The Whitaker Iron Company, Wheeling, W. Va., manufacturers of black and galvanized sheet iron, have placed a contract for the erection of their new steel rolling mill building, to replace the one destroyed by fire on November 12 of last year, with the Shiffler Bridge Company of Pittsburgh. The contract calls for the completion of this building within 90 days from February 28, but it is somewhat doubtful whether the plant will be ready for operation before summer. This building will be of steel, its dimensions being 135 x 515 feet. The statement that the contract price was about \$100,000 is untrue, the cost being very considerably less than this amount.

The bar mill of the Allentown Rolling Mill Company, Allentown, Pa., has resumed operations after a long idleness.

The rail mill and converter department of the Colorado Fuel & Iron Company, at South Pueblo, Col., have started up.

The Cohoes, N. Y., Rolling Mill received last week the first carload of steel billets ever used at those mills. The billets came from Pittsburgh.

The Bessemer Steel Works, at Troy, N. Y., have commenced this week to turn out projectile steel.

The forging hammer in the Albany Iron Works, Troy, N. Y., was lighted up last Friday night.

The Tennessee Coal, Iron and Railroad Company has blown out its No. 2 furnace at Bessemer, Ala., for repairs, and blown in furnace No. 4, which has just been overhauled.

Thomas Ward, general manager of the Birmingham Rolling Mill Company of Birmingham, Ala., advises us that the mill has resumed operations after a shut down of eight months on a larger and more extended scale than ever; that a new three-high plate train is under course of construction for them at Garrison & Co.'s, Pittsburgh, and will be shipped at an early date. In addition to the various forms of iron they manufacture they are now rolling soft steel billets and slabs into various sizes of bars, plates, firebricks and light section of rails.

The Marshallton Iron Works, at Marshallton, Del., which went into the hands of a receiver on January 12 and were then closed, have started up, giving employment to 500 hands. It is understood that a Philadelphia syndicate has taken charge of the works.

The two Woodstock coke furnaces at Anniston, Ala., are being overhauled and it is probable that they will resume operations at an early date.

It is reported that the Corning Steel Works, at Hammond, Ind., will start up in May, and it is further stated that C. H. Kaufman of Bridgeport, Ohio, formerly in charge of the three-high plate mill of the Aena-Standard Company, and a trustee of the Amalgamated Association, will be the superintendent. This plant consists of seven sheet mills and one three-high bar mill.

The sheet mills of the Reeves Iron Company, Canal Dover, Ohio, are laid off temporarily while a new bed plate is being placed under the engine. These mills are among the few which have been operated with regularity during the exciting times of the past year.

The New Philadelphia Sheet Mills, New Philadelphia, Ohio, were closed down for a few days last week as a mark of respect to E. C. Smith, whose obituary notice appears in another column. This week the whole plant, consisting of five sheet mills and sheet bar mill, is in operation. The galvanizing department of this company is now in operation.

The sheet mills and galvanizing shop of the Cambridge Iron & Steel Company, Cambridge, Ohio, are running at their usual gait. It is a fact worthy of note that a stoppage in these mills is a very rare occurrence.

The time for the creditors to give their assent to the plans of reorganization proposed by Cofrode & Saylor, Incorporated, and the Reading Rolling Mill Company, Reading, Pa., which concerns have been in the hands of receivers for about a year, expired on Thursday, the 15th inst., and only a small percentage of creditors had failed to respond, the others having formally assented to the plan. The general belief is that the plan will be adopted and put in operation, in which event the creditors will unite with the officials and receivers in petitioning the courts to restore the properties to the stockholders.

The puddlers employed at the Benwood Iron Works of the Wheeling Steel & Iron Company, Wheeling, W. Va., have agreed to accept \$4 per ton for boiling, and it is likely the puddling department of the above plant will be started up this week.

The blast furnace, plate mills and cut nail factory of the Junction Iron Company, at Mingo Junction, Ohio, were put in operation last week. For some time past this concern, like many others, have been running simply on orders as received, and shutting down again when these have been filled. At this time it is not known how long the plate mills and cut nail factory will continue in operation, but it is probable that the blast furnace will be operated right along.

We are advised that the statement that the J. Painter & Sons Company, Pittsburgh, contemplate the erection of several new cotton tie mills is untrue. What probably gave rise to the report is the fact that this firm have recently rebuilt two of their hoop mills which were worn out. As heretofore, the product of this concern consists exclusively of hoops and bands.

The Janson Iron Company are erecting a rolling mill at Columbia, Lancaster County, Pa., which they expect to have completed and in operation about April 1. The works will be equipped with two heating furnaces and two trains of rolls, one 12 and one 18 inch, and will have an estimated annual capacity of about 6000 gross tons of bar iron and steel. The officers are Joseph Janson, president; Valentine Janson, secretary and treasurer, and Frank Janson, manager.

The mills of the Pennsylvania Bolt & Nut Company and the East Lebanon Rolling Mills, both at Lebanon, Pa., have resumed, the men going back at the reduced scale of \$2.50 per ton. The Lebanon Iron Company's men also accepted a reduction to \$2.75 a ton for puddling, and the mill has started up.

The Wellman Iron & Steel Company of Thurlow, Pa., will start up their Bessemer department on orders recently received.

The Eureka Cast Steel Company of Chester, Pa., whose works have been running five days a week for some time past, have started up on full time.

For the first time in three months all the departments of the Pennsylvania Steel Company's plant, at Steelton, Pa., are now in operation, over 4000 men being employed.

Machinery.

The Eagle Iron Works of Jacob May, at 850 De Kalb avenue, Brooklyn, N. Y., are about to be largely increased in efficiency by the erection of a three-story and basement brick building, which will give the plant the dimensions of 25 x 200 feet.

The Westinghouse Machine Company of Pittsburgh have declared a quarterly dividend of 1½ per cent. on the preferred stock. The Westinghouse Electric & Manufacturing Company also recently declared a quarterly dividend of 1½ per cent. on the preferred stock, amounting to \$65,000.

The works of James Leffel & Co., Springfield, Ohio, are at present running only seven hours per day and four days per week.

Paxton & Vierling of Omaha, Neb., will shortly erect a new foundry building. The firm will expend \$50,000 in improving their manufacturing plant.

Work on the new machine shop of the Schenectady, N. Y., Locomotive Works was begun last week. The contract for the iron work has been awarded the Phoenix Iron Company of Phoenixville, Pa. The new building will be erected on the site of the old machine shop, and will be 368 x 80 feet and two stories high.

William B. Lurner, proprietor of the Bellevue, near Schenectady, N. Y., Foundry, has secured a number of orders, and will begin operations at his new plant about April 15 with a large number of employees and on full time.

M. Garland, manufacturer of sawmill machinery, cable conveyors and power transmission, at Bay City, Mich., has operated his works without interruption or reduction of force during the hard times, and is now employing an extra force, the largest ever employed by him.

The Riverside Iron Works Company have been chartered by the Secretary of State at Topeka, Kan., and are now the owners of the property of the Keystone Iron Works at Riverview, Kan. The new company are chartered with a capital stock of \$60,000, and have acquired by purchase all of the property of the old Keystone Iron Works that were recently sold to Lathrop Bullene at receiver's sale. The plant has been successfully operated for the past two years by the receiver, and at the time of the sale there were over \$20,000 worth of contracts on hand. All of these now come to the new company.

The Alexandria Iron Works have been organized at Alexandria, Ind., with a capital stock of \$20,000.

The Norwalk Iron Works Company of Norwalk, Conn., have received a number of good-sized orders, and are recalling the old men. The full force will soon be employed.

The Peck, Stow & Wilcox Company, Southington, Conn., have under consideration plans for the construction of a new malleable iron foundry and a new gray iron foundry. In former years the company manufactured its own iron and have decided to renew operations in this line.

The employees of the Swampscott Machine Company of South Newmarket, N. H., have instituted proceedings to force that concern into insolvency.

The Jeffrey Mfg. Company, Columbus, Ohio, manufacturers of chain belting and elevating and conveying machinery, are running their works to nearly full capacity, the men working eight hours per day. Orders are particularly heavy for chain belting, and this department is being operated to its utmost capacity.

The Babcock & Wilcox Company have removed their main office to more spacious quarters at 29 Cortlandt street, corner of Church street, New York.

The Smead Foundry Company of Toledo, Ohio, which collapsed some time ago and were reorganized, are again embarrassed and have closed their shops.

The Putnam Foundry Company of Putnam, Conn., will soon begin the erection of a new storehouse and pattern shop, made necessary by increased business.

The Sebastian-May Company, Sidney, Ohio, since their reorganization, have been busily engaged in remodeling the productive facilities of their plant, which is now completed. The changes are of such character as to enable the company to very materially enlarge their capacity. Among recent orders shipped are one lathe to China; seven to Pilacencia, Spain; one to

Buenos Ayres, S. A., and one to London, England.

Warren C. Johnson has leased his foundry and machine shop, at Oskaloosa, Iowa, to George Greasby. Mr. Johnson will continue to manufacture hot water heaters and coal drills.

The Morgan-Gardner Electric Company, manufacturers of electric railway and mining machinery, have opened a factory at 2638 and 2640 Shields avenue, Chicago. James P. Gardner is president and treasurer and E. C. Morgan is electrician and manager. The office of the company is in the First National Bank Building.

The Sullivan Machinery Company of Claremont, N. H., have resumed work on full time at the old rate of wages.

McVay & Walker, car builders, founders and machinists, Braddock, Pa., have the contract for all the lintels, window and door sills for the new warehouse and machine shop of the new plant of the Westinghouse Electric & Mfg. Company, now in course of erection at Brinton, Pa. The same firm have the contract for all the stairs and wrought iron work under the carpenter's bid. There will be about 14,000 feet of 1½-inch gas pipe for balconies, stairs and elevated track, with malleable fittings, and about 8 tons of wrought iron for joist anchors and ladders. This firm state they are in position to furnish anything in the iron line in connection with the building trades, from a flue ring and sash weights to castings of 30 tons.

The Vulcan Iron Company, Limited, New Castle, Pa., manufacturers of rolling mill machinery of all kinds, have just added to their machine shop a boring mill and a large sized draw head shaper made by the Morton Mfg. Company of Muskegon, Mich., and some new wood working tools have also been placed in their pattern shop. The firm have recently placed a contract with the Standard Scale & Supply Company of Pittsburgh for one large special scale of 20,000 pounds capacity. This scale will be used for weighing heavy foundry castings.

The Crowley Car Coupler Company recently organized at Youngstown, Ohio, have received an offer from the citizens of Struthers, Ohio, to erect a plant for the manufacture of couplers at that place. The offer is now being considered, and unless better inducements are offered by some other city, it is not improbable that the proposition will be accepted.

Hardware.

D. & H. Scovil, manufacturers of hoes, Higganum, Conn., suffered a loss of about \$4000 from a washout caused by heavy rains on the 10th inst.

The hardware factory of F. N. Goldwin, New Haven, Conn., has resumed work after a suspension of nine months.

The Kilbourn & Jacobus Mfg. Company, Columbus, Ohio, manufacturers of wheelbarrows, are operating their works to full capacity, eight hours per day being the rule. This plant has been operated in this manner since May of last year, and no reduction of wages has been made by this concern on account of business depression.

A. J. Huston, representing the Hart Mfg. Company, Cleveland, Ohio, manufacturers of the Duplex adjustable die stock, has just returned from a two months' trip through the Eastern and Southern States, having traveled as far south as Charleston, S. C., and west through the State of Texas. He reports business as being very much improved, especially through the Southern States. We are advised that the demand for the Duplex stock is steadily on the increase and recent shipments of the stock have been made to Australia, South Africa and various European points, while their trade in the States shows a decided improvement over the past few months. Mr. Huston is about to start on an extended trip through the West, as far as the Pacific coast.

Curtis & Curtis, Bridgeport, Conn., advise us that they are very busy filling large orders for Forbes pipe machines received by cable from England.

For about a year past the business of the Youngstown Stamping Company, Youngstown, Ohio, manufacturers of oil cans and tin specialties, has been conducted by W. C. Hine, receiver. Recently a plan has been formulated to take this concern out of the hands of the receiver, as some of the creditors are pushing for immediate liquidation of the assets, or for an enforcement of the stockholders' liability. The liabilities of the

firm are given at \$116,981.79, of which \$13,170.13 are preferred. According to present appraisal the assets are put at \$68,272.02, but if disposed of at public sale, it is claimed would not realize more than \$24,000. The solvent stockholders suggest that a corporation be organized with a capital of \$150,000 under the laws of a State having no double liability, and these will pay two-thirds of their liability in cash. They ask the unsecured creditors to take 20 per cent. in cash and 80 per cent. in stock of the new company.

The Peck, Stow & Wilcox Company, Southington, Conn., have completed their new carriage bolt shop, commenced early last fall. It has been fitted with new and improved machinery and many modern appliances, which they refer to as adapted for the manufacture of bolts of high quality. They also have under advisement plans for the construction of a new gray iron foundry, believing there will be no better opportunity for improving their facilities than the present.

Miscellaneous.

C. C. Dunn, who claims to control an important invention for the manufacture of iron sewer pipe, is trying to establish such an industry at Minneapolis, Minn.

The contract has been let for erecting the new plant of the Litchfield Car Works, at Memphis, Tenn. The buildings for which the contract was closed include that portion of the works known as the wheel foundry and soft foundry buildings, the dimensions being 80 x 250 feet.

The Department of Public Works of Cleveland, Ohio, is considering the subject of establishing a plant for the manufacture of pipe. It is proposed to employ convict labor to a large extent.

P. P. Mart & Co., Springfield, Ohio, manufacturers of agricultural machinery, are operating their shops to full capacity, giving employment to about 300 men. The principal output of this concern consists of drills and cider presses.

The Haskell & Barker Car Works, at Michigan City, Ind., have secured a contract for 1500 cars, and the plant, employing 1000 men, will resume operations within a few days, after six months' idleness.

The S. R. Smythe Company, engineers and contractors, Lewis Block, Pittsburgh, have received a contract from the Lawrence Glass Company, New Castle, Pa., for the construction of a window glass factory to contain all the latest improvements, including the Smythe tank system. The contract calls for the completion of the new works by September 1 next.

Warden, Bushnell & Glessner Company, Springfield, Ohio, manufacturers of agricultural machinery, are running their plant full time, giving employment to about 800 men. The output of this concern for this year is expected to be considerably larger than last year.

At the annual meeting of the stockholders of the Union Switch & Signal Company, held in Pittsburgh last week, George Westinghouse, Jr., chairman, read a supplementary statement showing that on March 8 the accounts and bills payable had been reduced to \$121,134.60, as against \$176,013.83 at the close of the company's fiscal year ending December 31, 1893. The reduction in this item of the company's liabilities was made after paying off the first series of bonds amounting to \$26,000, the interest on the remaining bonds due March 1, and the quarterly dividend on the preferred stock. The company have in their treasury \$103,000 of the preferred stock, which, if sold at par, would wipe out the company's debt, and put the common stock on a dividend paying basis at once. The old Board of Directors were elected, the entire vote, 17,931 shares, being cast for the present members.

Among recently authorized corporations in Illinois are the following: Standard Solder Company, Chicago; capital stock, \$50,000; incorporators, Wilson D. Trueblood, Edward M. Burt and John A. Wozencraft. Gilfillan Scale & Hardware Company, Chicago; capital stock, \$50,000; incorporators, E. N. Gilfillan, William N. Pelanze and Joseph O'Connor.

The Lake Shore & Michigan Southern Railroad Company will consolidate their shops for the building of locomotives, coaches and freight cars under one roof as soon as a location has been decided upon.

The Morrison Mfg. Company of Syracuse, N. Y., to manufacture and sell specialties, have been incorporated, with \$16,000 capital

and the following directors: John H. Morrison, Salida, Col.; Robert M. Francis, Charles H. Francis, Samuel J. Foster, Syracuse.

The S. R. Smythe Company, engineers and contractors, of Pittsburgh have received a contract for the erection of three 20-pot melting furnaces for McKee Brothers, glass manufacturers, Jeannette, Pa. When completed these improvements will double the capacity of the above firm for the manufacture of flint glass.

Among recently authorized corporations in Illinois are the following: Whiting Foundry Equipment Company, at Harvey; capital stock, \$100,000; incorporators, Nathan G. Moore, William B. McIlvaine and Max Baird. Whiting Car Wheel Company, at Harvey; capital stock, \$75,000; incorporators, Nathan G. Moore, William B. McIlvaine and Max Baird. Elastic Steel Wire Fence Patent Company, Chicago; capital stock, \$1,000,000; incorporators, Americus E. Johnson, Andrew W. Snyder, Daniel T. Snyder. The Electric Smelting & Aluminum Company, Chicago; capital stock, \$100,000; incorporators, Alfred H. Cowles, Loren Prentiss and Charles M. Vorce. Warner Hardware Company, Freeport; capital stock, \$20,000; incorporators, Lemen A. Warner, Geo. W. Warner and Emil A. Hoefer. Chicago Combination Machine Company, Chicago; capital stock, \$12,000; incorporators, John W. Birdwell, George S. Coles and Charles M. Wilson.

The Rich Frog Company have been organized at Muskegon, Mich., with a capital of \$50,000, of which \$30,000 is paid in. The company will manufacture the Rich patent frog for railway switches and other appliances used in railroad track laying.

It is stated that of 19 iron ore mines in operation in the vicinity of Mertztown, Berks County, Pa., five years ago, only four are now at work.

The rolling mill and forging department of the United States Car Company, at Birmingham, Ala., has started up on a large order for axles.

The Wheeling Corrugating Company, Wheeling, W. Va., have recently added to their equipment machinery for the manufacture of galvanized steel and tin eaves trough, conductor pipes, hangers, &c. This machinery has been put in operation and is working very satisfactorily. This firm are now in position to fill all orders for this material promptly, and expect to become one of the largest producers of it. They have recently gotten out some new ceiling designs, which are shown in a catalogue recently issued by the concern. A branch office has recently been opened at 472 Laflin street, Chicago, at which location a stock of everything made by the concern is carried, for the convenience of trade tributary to Chicago.

Westinghouse, Church, Kerr & Co. have removed their offices from 17 Cortlandt street to the Havemeyer Building, 26 Cortlandt street, New York.

The new and speedy United States cruiser "Columbia" is being put in readiness at Philadelphia for going into commission on April 1.

The General Electric Company, Lynn, Mass., have a contract for supplying \$100,000 worth of machinery to supply the electric power for propelling boats on the Erie Canal between Buffalo and Albany. The Cataract General Electric Company of New York are to procure the power from the Niagara Falls and the Lynn company will furnish the motors and wire the canal. The Westinghouse Company are to supply some of the generators.

Petroleum freights to the far East have fallen to the lowest rates on record, leaving, it is claimed, no profit to the carriers. The increase in Russian competition is becoming much felt in India, China and Japan.

The Iron ^{AND} Metal Trades.

Pittsburgh has obtained notable concessions on freights along the whole line of crude and finished products to Western and Eastern points, the details of which are presented elsewhere. The ugly feature in connection with the reduction has been that apparently a very considerable number of persons had the "tip" that the lower rates were coming, and accordingly utilized it to offer Steel Billets in tidewater territory at a sharp cut.

This reduction seems to be the last straw to break the camel's back, and Eastern mills are now practically helpless against Western makers. The great majority of them have nothing left but to wait until their large competitors are filled up and withdraw from the Eastern market at present prices. It is probably true that the Eastern territory has been the source of more tonnage of orders than any other section, because it does furnish the bulk of the general business, while the country west of the Alleghanies originates far more railroad work. Since that has dwindled down to practically nothing, the West is relatively lean this year.

The point has now been reached, so far as prices are concerned, that no one dares to leave contracts uncovered. In other words, the short side has become dangerous and holds out little promise of profit. Still buyers, and sellers for that matter, hope for little change during the next three months, and no one is inclined to anticipate unless he can get deliveries at present prices well up to the close of the year.

The misery of the railroads as buyers and the knowledge that even a moderate advance will bring into line a good deal of reserve capacity discourages any sanguine views.

In Pig Iron the patching up of the quarrel among the Southern lines leaves the Southern Iron makers in the position of being forced to petition for the lower rates which impending war seemed to promise them. They claim that rates must come down if they are to hold territory conquered in former years.

Through an aggregate of small transactions in Eastern territory Pittsburgh has placed considerable tonnage of Steel Billets, and is assuming a more confident tone. Chicago notes a better business and reports sales of 6000 tons.

The great Wire trade, which some time since dragged Soft Steel out of the mire and brought the first sign of encouragement, now shows symptoms of relapse. It simply means that the distributors whose orders caused such activity must now wait until their purchases are worked off.

The Wrought Iron Pipe trade is dull, but is hoping for the early development of the spring trade. An order for 25 miles has been placed in Pittsburgh. The raw material, Skelp, has sold at unprecedentedly low prices.

Youngstown appeared as the successful competitor for the Angles and Pittsburgh took the plates for a 2000-ton order from a bridge shop on the Delaware, the structure to be put up in New England.

Chicago.

(By Telegraph.)

Office of *The Iron Age*, 50 Dearborn street, CHICAGO, March 21, 1894.

The business situation shows more improvement. This is especially noticeable in the hardware trade and in other branches which come in direct connection with distribution among the masses of consumers. The starting of the local Rail mills and the blowing in of all additional blast furnaces give more tone to the situation and will undoubtedly have a moral effect in establishing confidence among those who are waiting for substantial signs of improvement before engaging in new enterprises. The one thing necessary to make the condition of business fairly satisfactory is an increased buying movement from the railroads, but that has not yet made its appearance.

Pig Iron.—The great bulk of the business now in progress consists of local Coke Iron. Transactions in this line appear to be growing larger and some good sized purchases are reported by the largest consumers. Small lots are in excellent request, and taken as a whole the volume of business is considered quite fair for the season. The output of Pig Iron in this locality has increased considerably within the past week or two. In addition to the Iroquois Furnace, previously reported, one stack is now in operation at Milwaukee and three have blown in at South Chicago. The demand for Southern Iron continues as light as heretofore reported and prices are weak. An occasional inquiry is noted for Lake Superior Charcoal, but actual business is confined to very small lots. Quotations are given as follows for cash:

Lake Superior Charcoal.....	\$15.00 @	\$15.25
Local Coke Foundry, No. 1....	11.75 @	12.25
Local Coke Foundry, No. 2....	11.00 @	11.75
Local Coke Foundry, No. 3....	10.75 @	11.00
Local Scotch.....	12.00 @	12.50
Ohio Strong Softeners No. 1....	13.00 @	14.00
Southern Silvery, No. 1.....	..... @	12.50
Southern Silvery, No. 2.....	..... @	11.75
Southern Coke, No. 2.....	11.25 @	11.50
Southern Coke, No. 3.....	10.75 @	11.00
Southern, No. 1, Soft.....	11.25 @	11.50
Southern, No. 2, Soft.....	10.75 @	11.00
Tennessee Charcoal, No. 1....	15.50 @	16.00
Tennessee Charcoal, No. 2....	15.00 @	15.25
Southern Gray Forge.....	10.25 @	10.50
Alabama Car Wheel.....	18.50 @	18.65
Jackson County Silvery.....	15.00 @	16.00
Other Ohio Silvery.....	13.00 @	13.50
Coke Bessemer.....	12.00 @	.....

Bars.—The past week was quiet. One or two transactions of fair size took place, but trade generally was confined to small lots, but the inquiry is improving, and it is expected that within the next two or three weeks quite a number of manufacturing consumers will place contracts to cover their requirements for at least part of the year. The wagonmakers report better prospects, and some of them will soon buy considerable quantities of material. Jobbers are also expected to place orders for stock, as they have latterly been doing a much better trade. Prices are irregular, and while Bar Iron continues to be quoted for mill shipment at 1.15¢ @ 1.20¢, Chicago, these prices can easily be shaded on anything like a good specification. Soft Steel Bars from Billet stock are still quotable at 1.20¢ @ 1.30¢; small lots from stock are quoted by jobbers at 1.35¢ @ 1.40¢ for Bar Iron, and 1.35¢ @ 1.50¢ for Soft Steel Bars.

Structural Material.—Nothing has transpired of special importance; the activity in building causes a very good trade in small lots of Beams and other Shapes from stock, but large transactions are wanting. Quo-

tations at present are as follows for Chicago delivery: Beams and Channels, 1.40¢ @ 1.45¢; Tees, 1.50¢ @ 1.60¢; Angles, 1.35¢ @ 1.45¢; Universal Plates, 1.40¢ @ 1.50¢. Small lots from stock are sold at an advance of 10¢ @ 15¢ @ 100 above these prices.

Plates.—Mill agents report a continued improvement in the demand and prospects are excellent for a larger volume of business as the season advances. Jobbers are also in receipt of good orders for small lots from stock. Mill shipments, Chicago delivery, are quoted as follows: Tank Steel, 1.85¢ @ 1.45¢; Flange Steel, 1.80¢ @ 1.90¢; Fire Box, 2¢ @ 5¢. Store prices are as follows: Iron or Steel Sheets, Nos. 10 to 14, 1.80¢ @ 1.90¢; Tank Steel, 1.65¢ @ 1.85¢; Flange Steel, 2.15¢ @ 2.35¢; Boiler Tubes, 75 % off.

Sheets.—A few contracts have been made for Black Sheets, but the demand is spasmodic. Quotations on mill lots of No. 27 Common Iron or Soft Steel are unchanged at 2.40¢ @ 2.50¢ Chicago, while small lots sell from stock at 2.85¢ @ 2.95¢. Galvanized Sheets are in a little better demand, and large buyers are inclined to close at the prices now current, believing that they will not be able to do any better. The local trade are greatly encouraged by the favorable prospects of repealing the city ordinance forbidding the use of Galvanized Iron bay windows and light shafts. While reports of lower prices are current, the general quotation on mill shipments of Juniata continues to be 75 and 10 and 5 % off. Small lots from stock are quoted at 75 %. Sheet Copper is unchanged at 30 % @ 40 % off for Light Sheets, and up to 45 % off for Heavy Sheets, according to quantity.

Merchant Steel.—The volume of business shows some improvement. The jobbers are buying rather more freely from manufacturers and large consumers are ordering additional quantities. We quote mill shipments, Chicago delivery: Smooth Finished Machinery and Tire, 1.75¢ @ 1.80¢; Open Hearth Spring Steel, 1.85¢ @ 1.90¢; Bessemer Machinery, 1.55¢ @ 1.60¢; Bessemer Tire, 1.40¢; Ordinary Tool Steel, 6¢ @ 7¢; Specials, 12¢ and upward.

Billets and Rods.—Sales of about 6000 tons of Billets have been made since our last report. They are now quoted at \$17.25 @ \$17.50. The Wire Rod situation is unchanged. The Joliet Mill will be probably repaired and started up some time next week. Prices are very firm at \$25.

Rails and Track Supplies.—The South Chicago Rail Mill was started on Monday, after an idleness of about six months. The demand for Rails has not materially improved, but enough orders have accumulated to justify starting the works. The managers are hopeful that they will be able to keep the mill in operation if not wholly on Rails, then probably on Billets. Prices on Standard Sections are unchanged at \$25 @ \$27, according to quantity. Fastenings are quoted at 1.40¢ for Splice Bars; 2.40¢ @ 2.45¢ for Track Bolts with Hexagon Nuts and 1.75¢ @ 1.80¢ for Spikes.

Old Rails and Wheels.—Old Iron Rails are very quiet and no special effort is made by the railroads to sell the stock which they now hold. Dealers quote nominally \$10.50 @ \$11, but frankly say that they would have difficulty in securing Rails at these prices.

Old Steel Rails are held at \$10 for long lengths, with consumers offering \$1 less. Short pieces have sold at \$6.75. Old Car Wheels appear to be scarce. A sale of 1000 tons was made last week, but negotiations had been pending for a long time and the quantity was secured after a great deal of trouble. Prices are about \$10.50 @ \$11.

Scrap.—A little better movement has taken place in some grades, but trade is far from active. Freight rates to the East have been lowered to correspond with reductions on Manufactured Iron to the West. Dealers quote the following selling prices $\text{\$}$ net ton: No. 1 Forge, \$8.50 @ \$9; No. 1 Mill, \$6 50; Pipes and Flues, \$6; Heavy Cast, \$7.50; Stove Plate, \$5 50 @ \$6; Fish Plates, \$12; Horse Shoes, \$8 50; Mixed Steel, gross ton, \$5.

Metals.—Lake Superior Copper in carload lots is unchanged at 10 $\frac{1}{2}$ ¢, and Casting Copper remains at 9.50¢; Spelter is quoted at 3.65¢, but prime brands are held at 3.70¢ @ 3.75¢. Pig Lead has sold up to 3.25¢, and there is now more inquiry with prospects of large transactions between this time and the close of the month.

The Carpenter Steel Company have found it necessary to carry stock in Chicago for the accommodation of their customers, from whom the demand steadily increases for the different grades of fine Steel manufactured by the company. They have leased the warehouse at 25 West Lake street, Chicago, and will carry a large assortment of sizes of Steel of suitable quality for tools, dies, milling cutters, punches, drills, chisels, &c. F. W. Lane is resident manager.

Philadelphia.

Office of The Iron Age, 220 South Fourth St., PHILADELPHIA, Pa., March 20, 1894.

The condition of the market has not improved within the past few days. Pig Metal is comparatively steady, but Billets and Finished Material are weak and depressed and hardly quotable on large lots. To make matters still worse, the railroads are said to be cutting East-bound freights, with an intimation that the rate war has hardly commenced. It is claimed that \$1.70 is accepted against a nominal rate of \$2.30, and that before the end of the week business will be done at less than \$1.70. This, of course, remains to be proved; but whether there is any further change or not, the situation is so uncertain that the trade do not know where they stand. Those who have bought at a delivered price will expect to get the benefit of the reduced rates, while those who took the risk of figuring on a lower rate and making prices in proportion, will feel that they are entitled to any benefit that may accrue from that source, so that all the way through the result is uncertainty and demoralization. The volume of business is not increasing to any appreciable extent, and although the demand is of a more general character, it is difficult for the mills to hold their own compared with the earlier months of the year. The reduced rates from the West will make the situation still more onerous, as it gives an additional advantage to mills in that section of at least 50¢ @ \$1 $\text{\$}$ ton. The only hope that the trade seem to have is that something unexpected will happen and thereby give things a turn which seems almost hopeless under present conditions.

Pig Iron.—The market is not materially different to what it has been for several weeks past, although the general movement may be a trifle larger. There is no change in prices, however, and anything that a buyer could have last week, or during several previous weeks, could just as easily be had today. On the other hand, there is no particular pressure to realize, so that matters drift along from day to day almost without a shadow of deviation. Under such conditions there is nothing upon which to base predictions of change, either favorable or unfavorable, but on the contrary the indications are all in favor of a continuance of the prevailing monotony for an indefinite period. General quotations are about as follows for Philadelphia and nearby points:

No. 1 Foundry	\$13.00 @ \$13.50
No. 2 Foundry	12.25 @ 12.75
Standard Gray Forge	11.00 @ 11.25
Ordinary Gray Forge	10.75 @ 11.00
No. 1 Soft	12.00 @ 12.25
No. 2 Soft	11.00 @ 11.50

Steel Billets.—There is some inquiry for Billets, and possibly a few sales have been made, but owing to the demoralization in freights it is hard to get down to exact figures. There are intimations that sales have been made at less than \$17 delivered, and some large buyers expect to get in at a still lower figure, but of course all depends on freights, which are understood to be \$1.70 instead of \$2.30. Agents for Western mills intimate that they have reason to believe that rates will be still lower, but the entire situation is one of doubt and uncertainty. Bids are urgently asked for, and from the general appearance of things, it is thought that \$17 delivered could easily be done on the right kind of an offer, although nominal rates are \$17.25 to \$17.50, but all depends on the kind of offer that is made.

Finished Material.—The situation is certainly no better than it was a week ago, and in some respects it is worse. There is no decided improvement in the demand, and while there are pretty good prospects in some lines, such as in the building trades, others are uncertain and none are what could be fairly called bright or encouraging. Add to this the fact that the Western mills are quoting lower prices than ever and are getting lower freights than ever, there is very little chance for local mills to secure any business except for specialties or for retail lots, quick delivery. It is claimed that Pittsburgh is making an open quotation of 1c. $\text{\$}$ lb. f.o.b. on Plates, Bars and Angles, which with a 10 cent freight make it impossible for local mills to compete successfully on large orders. In cases in which quality is an indispensable feature they get their share of business, but on ordinary stock they are out of the race. Inquiries for material are not important, except for structural work, which will probably be on a larger scale than ever. General quotations are as follows, but on large lots buyers come very near to naming their own figures:

Grooved Skelp, delivered	1.15¢ @ 1.25¢
Best Refined Bars	1.20¢ @ 1.30¢
At interior points	1.10¢ @ 1.15¢
Tank Steel	1.20¢ @ 1.30¢
Heavy Plates	1.30¢ @ 1.40¢
Shell	1.40¢ @ 1.50¢
Flange	1.60¢ @ 1.80¢
Angles	1.20¢ @ 1.30¢
Beams and Channels	1.50¢ @ 1.60¢

Old Material.—The demand does not increase, and holders find it no easy matter to move stocks even at the low figures now ruling. General quotations are about as follows, but it is impossi-

ble to do more than give a general idea of values:

Heavy Melting Steel	\$10.00 @ \$11.00
Light Melting Steel	8.00 @ 9.00
No. 1 Wrought Scrap	10.00 @ 11.00
Machinery Cast	9.50 @ 10.00
Wrought Turnings	8.50 @ 9.00
Cast Borings	6.50 @ 7.00
Old Iron Rails	12 50 @ 13.00

St. Louis.

(By Telegraph.)

Office of The Iron Age,
Bank of Commerce Building,
St. Louis, March 21, 1894.

Pig Iron.—The demand continues the same as last reported, light and unsatisfactory. Many concerns are running only half time with reduced forces, and until there is sufficient business for them to resume full time with full forces any improvement in Pig Iron is out of the question. Sales are limited to car lots, with occasionally a sale of from 100 to 200 tons, and prices are weaker with each succeeding sale. We quote as follows for cash, f.o.b. cars St. Louis:

Southern Coke, No. 1 Foundry	\$11.50 @ \$12.00
Southern Coke, No. 2 Foundry	10.50 @ 10.75
Southern Coke, No. 3 Foundry	10.25 @ 10.50
Southern Gray Forge	9.75 @ 10.00
Southern Car Wheel	17.00 @ 18.00
Lake Superior Car Wheel	16.25 @ 16.50
Ohio Softeners	14.75 @ 15.00

Bar Iron.—There is no improvement to note, either as regards prices or the volume of business. Mills now quote 1.10¢, which is about as low as they are willing to go. The market is weak, however, and still lower prices are anticipated. Jobbers ask 1.30¢ @ 1.35¢, according to quantity.

Barb Wire.—There appears to be no cessation in the demand for Barb Wire, but prices do not appear to be quite as firmly held as heretofore. Mills quote \$2 @ \$2.05 for Painted, with 40¢ $\text{\$}$ cwt. additional for Galvanized. These prices are shaded 5¢ $\text{\$}$ cwt. for carload orders.

Wire Nails.—Wire Nails continue in the unsettled condition noted in our last report. Outside mills are making some low prices, and unless there is an immediate improvement in the demand lower prices are almost inevitable. Mills ask from \$1.15 to \$1.20 in carload lots, with the intimation that these prices would be shaded.

Rails and Track Supplies.—This department has again settled down to a position which is apparently characterized dead dull. Prices are unchanged as follows: Splice Bars, 1.40¢ @ 1.45¢; Spikes, 1.75¢ @ 1.80¢; Bolts, Square Nuts, 2.20¢; with Hexagon Nuts, 2.30¢; Links and Pins, 1.75¢ @ 1.80¢. Old Iron Rails are neglected at from \$10 to \$11, while Steel Rails, are nominally quoted at \$26 @ \$26.50.

Pig Lead.—Continued improvement has characterized this metal since our last report. Sales during the past week have been moderately heavy at from 3.15¢ to 3.25¢, closing to-day at 3.20¢ bid and 3.25¢ asked. The market is in excellent condition, and will quickly respond should the present demand continue.

Spelter.—There is no change to report. Sellers ask 3.65¢, while 3.60¢ seems to be the buyers' limit. Stocks in both producers' and consumers' hands are unusually light, and any kind of an

active demand would send prices up very rapidly.

Theo. Hiertz & Son, St. Louis, Mo., manufacturers of Nonpareil anti-friction metal, report an increased trade for this metal. They are now booking some heavy orders, and their business up to this date shows a satisfactory increase over the same period of last year. They also manufacture Babbitt Metals, Solder, Lead Seals, Electrotype and Stereotype Metal.

Pittsburgh.

(By Mail.)

Office of *The Iron Age*, Hamilton Building, Pittsburgh, March 21, 1894.

In spite of the fact that prices on both Raw and Finished Iron and Steel are no better, but in some cases are lower, there is a better feeling in the trade, and it is the impression that the volume of business will soon show substantial gains. In fact, there has been considerable increase in tonnage during this month, this applying to Pig Iron, Billets and Finished Material. The unparalleled low prices that prevail on nearly everything will undoubtedly lead to increased consumption, and in addition to this the recent reduction in freights both East and West from Pittsburgh will throw a very large amount of business to this city. During the last nine months Pittsburgh has conclusively shown that she can compete for trade in any part of the United States, and can get it. The additional advantages obtained by the reduced freight rates can hardly be estimated.

Pig Iron.—The past week has been quite an active one and some heavy transactions in Bessemer Pig have taken place. Of course, at all times there is more or less trading of Pig Iron for Coke and Pig Iron for Steel or *vice versa* going on, but within the past few days there have been purchases of a number of good sized lots of Bessemer Pig. These purchases have been mainly by Steel makers whose output of Pig Iron does not equal their converting capacity. The increased inquiries for Steel have also helped Bessemer Pig, and a sale of 5000 tons at a price equal to \$10.40, Pittsburgh, is regarded as conclusive evidence by some that the bottom of the market has been reached for the time being. In the Pittsburgh district Carrie No. 2 went in to-day, thus leaving Soho and one Isabella the only idle furnaces in Allegheny County. There is very little doing in either Gray Forge or Foundry Iron, but prices are without material change. We quote as follows:

Neutral Gray Forge.....	\$9.50 @ \$9.60, cash.
All-Ore Mill.....	9.60 @ 9.75 "
No. 1 Foundry.....	11.50 @ 11.75 "
No. 2 Foundry.....	10.50 @ 10.75 "
Bessemer.....	10.40 @ 10.50 "

In addition to the above sale of 5000 tons of Bessemer, we are advised of another transaction involving 10,000 tons, which was in the nature of a trade; also a sale of 2000 tons of Bessemer at \$10.40, Pittsburgh, and one of 1000 tons at \$10.50, Pittsburgh; also a sale of 1000 tons of Gray Forge for March, April and May at a price equal to about \$9.50, Pittsburgh.

Billets.—The Steel market during the past week has shown a large increase in inquiries and considerable tonnage has been placed. A buyer who thoroughly canvassed the Pittsburgh and Wheeling markets reports the mills as all having considerable

Steel booked, some of them being well filled for the next two months or longer. The reduction in freight rates on Billets from Pittsburgh to New York and Philadelphia of 60¢ per ton will undoubtedly lead to considerable Eastern business, as there is a possibility that these rates may be withdrawn at any time. In the present condition of the market, it is not probable that \$15.50 at maker's mill would be shaded under any conditions, and some concerns are refusing to meet even that price and are holding at \$15.75 at mill. We note a sale of 1000 tons for March, April and May at \$15.50, f.o.b. Pittsburgh, also a sale of 5000 tons for Eastern shipment, for March, April, May and June at a price equal to \$15.50, Pittsburgh.

Structural Material.—The low prices ruling for Beams and Channels are being taken advantage of by buyers and considerable tonnage is being placed. A good many inquiries are in the market, and it is the impression that just as soon as the trade come to the belief that prices are as low as they will go, active buying will commence. We have reduced quotations on Beams and Channels and now quote as follows: Beams and Channels up to 15 inches, 1.15¢ @ 1.25¢, according to order. For very desirable business 1.10¢ Pittsburgh has been done on Beams; Angles and Universal Plates, 1.15¢ @ 1.25¢; Tees, 1.35¢ @ 1.40¢.

Plates and Sheets.—The report that Pittsburgh had offered Plates in the Eastern market at a price equal to 1¢ Pittsburgh is denied by a certain maker here. It is claimed they have not gone below 1.10¢ at mill. There is fair inquiry for Plates and the mills generally are fairly well fixed with business. Considerable work for extreme Western shipment is in sight, and altogether the outlook, as far as tonnage is concerned, is favorable. We have reduced quotations slightly and now quote as follows: Tank Steel, 1.10¢ @ 1.20¢; Flange, 1.50¢ @ 1.60¢; Shell, 1.30¢ @ 1.40¢; Fire Box Steel, 1.75¢ @ 4¢, according to quality. The Sheet trade continues very quiet, and prices are lower than ever before in the history of the trade. We quote No. 24 Soft Steel Sheets at 2.10¢; No. 26 at 2.20¢, and No. 27 at 2.30¢ at mill. It is claimed that even these low prices have been shaded in recent transactions.

Ferromanganese.—We continue to quote at \$52, delivered, for 80 % domestic.

Bars.—Some orders from implement makers have come into the market recently and there has also been some car business placed, involving considerable tonnage. While the outlook is slightly improved, prices are as low as ever. It is stated that in a recent specification, including some Structural Shapes, Steel Bars were offered at 90¢, but it is not probable that this price would have been named had there been no other material with the specification. For desirable specifications Common Iron Bars have sold down to 95¢. It is altogether probable that the request of the Valley mills for a \$4 puddling rate will be granted at a conference to be held in Youngstown this week. We quote Common Iron Bars at 1¢ @ 1.10¢ according to order, although some mills are refusing to meet the lower quotation. Soft Steel Bars may be quoted at 1.05¢ @ 1.15¢ at mill, with Bar Iron extras.

Muck Bars.—For best grades of City made Muck Bars \$19.50 @ \$20 is asked. Outside makes are being offered at \$19, Pittsburgh, and less.

Merchant Steel.—The recent reductions in freight rates have stimulated business to some extent, and shipments from mills are somewhat heavier. On ordinary lots prices are ruling about as follows: Bessemer Machinery, 1.30¢ @ 1.35¢; Open Hearth Machinery, 1.60¢ @ 1.70¢; Open Hearth Spring, 1.70¢ @ 1.75¢; Toe Calk, 1.90¢; Tire, 1.60¢; Sleigh Shoe, 1.75¢ @ 1.85¢; Cold Rolled Shafting, 2 65¢ base.

Skelp Iron and Steel.—Several large contracts for Steel Skelp have recently been placed in this market, and some very low prices have been made. A case in point is that of a recent sale of Grooved Steel Skelp at 1¢ delivered, four months flat, with a 7¢ freight rate. We quote as follows: Grooved Steel Skelp, 95¢ @ 1.05¢; Sheared Steel Skelp, 1.10¢ @ 1.15¢; Grooved Iron Skelp, 1.15¢ @ 1.20¢; Sheared Iron Skelp, 1.25¢ @ 1.30¢.

Wire Rods.—The Western mill referred to last week as having some Rods to sell for this and next month have received offers of \$24 @ \$25, at mill, but have refused to accept even the higher price.

Pipes and Tubes.—The order for 75 miles of Line Pipe referred to several weeks ago as having been taken by an Eastern concern has been relet and the order taken by Pittsburgh. It is made up of 2½, 3, 4, 6 and 8 inch Pipe, and is the largest contract placed in this market for some time. The Pipe and Tube trade shows no improvement either in demand or prices. Now that spring trade is opening up, however, makers believe that the demand will soon show improvement.

Barb Wire.—The mills continue well employed, there being a fair tonnage coming in right along, which, taken in connection with the heavy orders booked in January and February, will give mills about all they can do for the next couple of months. The price of Four-Point Galvanized in carload lots in the Pittsburgh district is being maintained at \$2.15, while some mills refuse to go below \$2.20. Painted in carload lots is ruling at \$1.75 @ \$1.80. Plain Wire is in good demand at \$1.85 in carload lots at mill and \$1.40 in less quantities.

Wire Nails.—The Wire Nail market, so far as the Pittsburgh district is concerned, is showing signs of demoralization to some extent. It is claimed that much of this was caused by the entrance of a large maker into the market who is credited with taking a number of large orders on the basis of 90¢ at mill. Other makers, however, have positively refused to meet this price, and are holding their product at \$1 @ \$1.05 at mill. For ordinary lots of Wire Nails, the market is represented by the quotation of \$1 at mill. For desirable specifications it is probable that this price will be shaded 5¢ by some makers. There is a fairly good demand for Cut Nails, and the market is represented by the quotation of \$1 at mill in carload lots and 95¢ for desirable specifications.

Connellsville Coke.—The market shows no improvement either in demand or prices. The report that Foundry Coke is being offered at less than \$1 per ton in the Connellsville region is emphatically denied. For the week ending Saturday, March 10, there were 11,105 ovens in the Connellsville region in blast and 6408 idle, the total estimated production for the week being 108,701 tons. We continue to quote

Furnace Coke at 85¢ @ 90¢, according to nature of order. Foundry Coke has been sold down to \$1 per ton in special cases; the ruling prices to consumers, however, are \$1.05 @ \$1.15 at oven.

Freight Rates.—Taking effect on Saturday, March 24, freight rates on Pig Iron, Billets and articles of Iron and Steel manufacture from Pittsburgh, and points taking Pittsburgh rates, will be very materially reduced, rates on Billets to New York and Philadelphia being cut 50¢ per ton. The reduced rates, which go into effect on the above date, are as follows:

From Pittsburgh to—	Pig Iron.	Billets.	Iron and Steel articles.	
			Car-loads.	Less car-loads.
New York, N. Y.	\$1.90	\$2.10	\$0.12	\$0.15
Philadelphia, Pa.	1.60	1.70	.10	.13
Boston, Mass.	2.30	2.50	.14	.17
Albany, N. Y.	1.90	2.10	.12	.15
Utica, N. Y.	1.90	2.10	.11½	.14
Baltimore, Md.	1.30	1.50	.09	.12
Binghamton, N. Y.	1.50	1.70	.10	.13
Syracuse, N. Y.	1.80	1.90	.10½	.12½
Buffalo, N. Y.	1.30	1.30	.08	.09½
Rochester, N. Y.	1.50	1.70	.09	.11
Richmond, Va.	2.30	2.50	.14	.17
Elmira, N. Y.	1.50	1.70	.09	.11
Brockport, Pa.	1.50	1.70	.....	.....
Hornellsville, N. Y.	1.50	1.70	.....	.....

(By Telegraph.)

Billets.—The improvement in the condition of the Soft Steel trade continues. Many inquiries from the Eastern market are being received, largely due to the heavy cut in freights. As the Pittsburgh mills all have considerable Steel booked for the next two or three months, any material increase in demand is expected to lead to better prices. The minimum price of Billets in Pittsburgh to-day is \$15.50 at mill, and several concerns are refusing to go below \$15.75.

Cincinnati.

(By Telegraph.)

Office of *The Iron Age*, Fifth and Main Sts., CINCINNATI, March 21, 1894.

The market has been quiet and barely steady during the week, there being no large sales effected, although toward the close there was more inquiry for the lower grades of Southern Iron, which it is hoped may result in more business in the future. Northern consumers of Iron want Southern Iron to improve their mixture, but are deterred from buying by the high freight rates, and there is a movement on foot to have them modified this season, but whether it will be successful time alone can determine. Prices are well sustained on the small business passing, and nearly all kinds of Iron are being taken. Some of the Southern furnaces are meeting the moderate demand quite freely, while others are not free sellers at present prices, but there is nothing to warrant any essential change in quotations. A sale of 1000 tons Standard Car Wheel Iron was made at a concession about equal to interest on the money until it was to be consumed, which for a part of it was for two or three months ahead. Quotations are merely nominal, as follows:

Foundry.

Southern Coke, No. 1.....	\$11.00 @	\$11.25
Southern Coke, No. 2.....	10.00 @	10.25
Southern Coke, No. 3.....	9.50 @	9.75

Ohio Soft Stone Coal, No. 1....	14.50 @	15.50
Ohio Soft Stone Coal, No. 2....	14.25 @	14.60
Lake Superior Coke, No. 1.....	13.00 @	13.50
Lake Superior Coke, No. 2.....	12.00 @	12.25
Hanging Rock Charcoal, No. 1..	17.00 @	17.50
Hanging Rock Charcoal, No. 2..	16.50 @	17.00
Tennessee Charcoal, No. 1.....	13.50 @	14.00
Tennessee Charcoal, No. 2.....	12.50 @	13.00

Car Wheel and Malleable Irons.

Standard Southern Car Wheel	16.75 @	17.10
Lake Superior Car Wheel and Malleable.....	16.50 @	17.00

Forge.

Gray Forge.....	9.00 @	9.25
Mottled Coke.....	9.00 @	9.25

Financial.

Uncertainty as to the fate of the Bland Seigniorage bill, which passed last week in the Senate and now awaits either the approval or the veto of the President, has given a decided check to the reviving activity of Wall street. Speculation in stocks has, for the moment, quite died down; and although the market maintains its recovered strength to a great degree, it is again marked by dullness and purely professional trading. The extraordinary fluctuations in the prospects of tariff legislation, too, serve to still further repress reviving confidence. The Wilson bill, as amended by the Democratic members of the Senate Finance Committee, was reported to the Senate on Tuesday, and action will be taken on their report on April 2. Yet there is no guarantee that anything decisive will then be done. In fact, it appears more than likely that the matter will drag on indefinitely. This means an indefinite continuance of the present depressed condition of affairs in the financial and industrial worlds, lack of confidence and absence of enterprise and speculation. How much these undesirable symptoms would be aggravated by the enactment of the Bland bill and the revival of the silver question, is a matter of speculation which will become of great interest should President Cleveland, in order to facilitate the passage of the Wilson bill, refrain from exercising his power of veto.

Meanwhile, were these legislative matters not occupying the attention of the country, the conditions otherwise would be favorable to a gratifying revival of business. With the continuance of mild, spring-like weather, an unusually early movement of goods has taken place throughout the country. Agricultural operations have been begun in the West, which have caused an increased consumptive demand for certain staples. Factories are starting on all hands to replenish exhausted stocks, although prices are on the whole the lowest on record. Yet the stimulated demand calls for more goods, and manufacturers are glad to meet the call, notwithstanding the narrow margins of profit which accrue to them.

Turning to the railway earnings as a gauge of the condition of business, same encouragement is also visible. According to the *Financial Chronicle*, the gross earnings of 70 roads for the first week of March fell but 12% short of those of the same roads a year ago, which is an improvement of 2% over the previous week. The recent declarations of full regular dividends by some of the more important roads and the striking economies effected in operating expenses have tended to strengthen railroad stocks and create a better feeling in this important branch of national finance.

Failures in the United States for last week show, too, a gratifying decrease both in numbers and importance. *Bradstreet's* places them at 231, compared with 233 in the previous week and 221

and 219 in the corresponding week of 1893 and 1892. Of these, 205 were for \$5000 or less and only five for over \$50,000. Thus the failures are but little above the average, showing that the real stringency is a thing of the past.

The statement made on Saturday by the Associated Banks of this city shows a continued accumulation of idle funds, indicating anything but activity in general business. The average gain in cash was \$3,500,000. Deposits increased more largely than loans, which expanded, however, more than \$3,000,000. The net result of all changes was a gain of \$1,668,925 in the surplus reserve, which now stands at \$77,302,300 above legal requirements.

Owing to the contraction of speculation on the New York Stock Exchange last week the bank clearings show a rather sharper decline, being some 33% smaller than a year ago. The money market rules quiet. Loanable funds are in abundant supply, and the demand, if anything, rather less than a week ago. Rates remain practically unchanged. Call loans are 1%, and time money 2% for 30 to 60 days, 2½% for 90 days, and 3% for 4 to 7 months. Mercantile paper continues dull, not because there is little demand for this material, for the demand is active, but because there is so little good paper offering. Indorsed bills are quoted at 3%, choice single names at 3¼% @ 4½%, and other names at 4½% @ 5½%.

The volume of dealings on the Stock Exchange has been small during the past week as compared with those of the previous week. The only stock in which any large movement was noted was American Sugar, of which stock there was heavy selling early in this week. The Granger issues have kept their strong tone, and generally show an advance over last week's prices. National Lead, and Cordage, too, have scored gains, together with one or two other "industrial" stocks. On the whole, business on the Stock Exchange has been commonplace and tame. The fluctuations that have occurred during the past week in some of the more active stocks are noted in the appended list, together with closing prices on March 21:

	High-est.	Low-est.	Closing Mar. 21.
Am. Sugar Ref.....	93¾	88¾	89½
Atchison, T. & S. Fé....	15¾	14¾	15½
Chicago Gas.....	66¾	62¾	65
Chic. B. & Q.....	84¾	80¾	83¾
Chic. Mil. & St. Paul..	64¾	62¾	64½
Chic. Rock Isl. & Pac..	71¾	69¾	70½
Gen. Electric.....	43	41½	42½
Louisville & Nashville..	50¾	48	49½
Missouri Pacific.....	27¾	26½	27½
National Lead, Common.	36	33	35¾
New York Central.....	101½	98¾	100½
N. Y. & New England..	11¾	9¾	10½
Northern Pacific, Pfd..	22¾	19¾	22¼
Union Pacific.....	19¾	18¾	19
Western Union.....	86¾	84¾	85¾

Railroad and miscellaneous bonds have been active, and the aggregate volume of business in these securities large. Prices are firm and higher for first-class issues. Government bonds are firm. The closing quotations on Wednesday were as follows:

	Bid.	Asked.
2's, 1891, registered.....	96	.....
4's, registered.....	112¾	113½
4's, coupon.....	114	114¾
5's, registered.....	117¾	117½
5's, coupon.....	117¾	117¾

The Sterling Exchange market remains firm, with rates up to the gold-exporting point. On the news of the passage of the Bland bill by the Senate \$1,250,000 in gold was engaged for export to London and shipped last Saturday. It was expected that this move-

ment would have been followed by further shipments by the mid-week steamers, but that has not been the case. It is expected, however, that more gold will be sent over on Saturday. Actual business in Sterling was done on Wednesday at \$4.87½ @ \$4.87½ for 60 days, \$4.88½ @ \$4.89 for demand, \$4.89½ for cables and \$4.86½ @ \$4.86½ for commercial.

Domestic exchange on New York is quoted as follows: Chicago, 70 premium; St. Louis, 75 premium; Charleston, buying par, selling ½ premium; New Orleans, commercial 75 premium, bank 150 premium; San Francisco, sight 15, telegraph 20; Boston, 5¢ discount and par.

Metal Market.

Pig Tin.—Very little change in prices has taken place here despite the somewhat wide fluctuation in London quotations, and speculation has continued very tame. Purchases by interior dealers and consumers have been of somewhat larger volume, however, and made quite an impression upon stocks in first hands. At this writing the tone of the market seems to be quite steady, with 19.05¢ @ 19.15¢ quoted for 5-ton lots, net cash terms, and the usual premium for ordinary jobbing quantities. On distant future deliveries 19.10¢ was bid.

Copper.—More business has been done in Lake Superior Ingot, chiefly on home account, but prices have suffered slightly, some brands going at 9½¢. The Calumet & Hecla sold at that price quite freely. Business in Electrolytic has increased considerably, several million pounds having been placed, for delivery during the next six months. The prices are not divulged but the market is now quoted stronger at 9½¢ @ 9½¢. Casting stock has met with better sale also and prices are steady, with 9½¢ @ 9½¢ quoted for most brands.

Pig Lead.—Sales of Common Western in this market during the past week aggregate 1200 tons or more. With the increase in business there has been a further advance in prices. The dealings were at from 3.37½¢ @ 3.45¢ for round lots, up to 3.47½¢ for single carloads. At this writing there is little, if anything, on sale at less than 3.50¢. There were bids of 3.45¢ for May delivery on speculative account, chiefly by operators who went "short" of the market when it was considerably lower than it is at the present time.

Spelter.—Contrary to general expectation, prices have softened somewhat instead of turning for the better, and ruled relatively lower here than in the Western market. Ordinary brands were freely offered at 3.85¢ without stimulating purchases, and a shading to 3.80¢ brought about sales of a few carloads only. The demand in this quarter is exceedingly slow at present and below the average for the season.

Antimony.—The market is steady at 8½¢ @ 9¢ for Hallett's and 10½¢ @ 10½¢ for Cookson's, with a moderate business passing.

Nickel.—Moderate sales have been made at 40¢, and that price is evidently full high for other than small quantities.

Tin Plate.—Disappointment over the volume and character of business has been expressed by sellers, and it would appear that the market has lost rather than gained tone during the week under review. Spot purchases

have been almost wholly of retail character, and, in some instances, at prices below those generally quoted. Orders for futures have been placed with a degree of reserve that is extremely remarkable considering the low prices named by sellers. This extreme dullness is attributed to uncertainties connected with pending tariff legislation. We quote: Coke Tins—Penlan grade, IC, 14 x 20, \$5.15; J. B. grade, do., \$5.25; Bessemer full weight, \$5.20; light weights, \$4.80 for 100 lb, \$4.70 for 95 lb, \$4.55 for 90 lb. Siemens Steel scarce. Stamping Plates—Bessemer Steel, Coke finish, IC basis, \$5.40; Siemens Steel, IC basis, \$5.50; IX basis, \$6.60. Charcoals—Melyn grade, IC, \$6.35; Crosses, \$7.87½; Allaway grade, IC, \$5.40 @ \$5.50; Crosses, \$6.60; Grange grade, IC, \$5.60; Crosses, \$6.70. Charcoal Ternes—Worcester, 14 x 20, scarce; do., 20 x 28, \$11.35; M. F., 14 x 20, \$7.25; do., 20 x 28, \$14.50; Dean grade, 14 x 20, \$5.25; do., 20 x 28, \$10.50; D. R. D. grade, 14 x 20, \$5.15; do., 20 x 28, \$9.90; Alyn, 14 x 20, \$5.25; do., 20 x 28, \$10.40; Wasters—S. T. P. grade, 14 x 20, \$4.60; do., 20 x 28, \$9; Abercane grade, 14 x 20, \$4.50; do., 20 x 28, scarce.

The monthly production of Copper in the United States has been as follows, the first column giving the aggregate returns from the reporting mines, which include the principal Lake, Montana and Arizona producers; the second being the metal from pyrites and from a number of smaller outside sources, being estimated:

American Product.			
	Reporting mines. Gross tons.	Outside sources. Gross tons.	Total Gross tons.
Second half 1892.....	59,230	6,287	65,516
First half 1893.....	62,470	6,478	68,948
Second half 1893.....	67,290	6,252	73,542
Total 1893 ..	129,760	12,730	142,490
1894.			
January...	10,832	1,340	12,172
February...	10,245	1,340	11,585

The product of the foreign reporting mines and the United States exports was as follows:

	Foreign reporting mines. Gross tons.	United States exports. Gross tons.
Second half 1892.....	39,655	17,980
First half 1893.....	41,048	20,361
Second half 1893.....	40,647	60,081
Total 1892	81,495	80,362
1894.		
January	6,145	7,717
February.....	7,217	5,580

New York.

Office of *The Iron Age*, 96-102 Reade street, }
New York, March 21, 1894. }

Pig Iron.—While some of the furnace agents report quite a fair volume of business, others find sales very slow. The lowering in rates of freight from the Mahoning Valley, amounting to 50¢ per ton, places American Scotch from that section at closer prices here, say, \$13.75 @ \$14 for No. 1, and \$12.75 @ \$13 for No. 2. We quote standard brands \$13 @ \$13.50 for No. 1; \$12 @ \$12.50 for No. 2; \$11.25 @ \$12 for Gray Forge, at tidewater. Southern Iron, same delivery, \$12.75 @ \$13.25 for No. 1; \$11.25 @ \$11.75 for No. 2; \$11 @ \$11.25 for No. 3; \$11.25 @ \$11.75 for No. 2 Soft, and \$11.75 @ \$12 for No. 1 Soft. Foundry No. 4 (Foundry Forge) is \$10.50 @ \$11.

Ferromanganese and Spiegeleisen.—This market is exceedingly dull. We quote domestic Ferromanganese \$51 @ \$51.50, tidewater, and foreign Spiegeleisen nominally \$21 @ \$22 for 10%, and \$24.50 @ \$25 for 20%, ex-ship.

Billets and Rods.—The cut in freights to \$1.90 has placed the limit of Western Billets lower. We quote \$17.50 @ \$18 for domestic, and nominally \$27 @ \$27.50 for foreign. Domestic Wire Rods are nominally \$27.25 @ \$27.50, and foreign \$39 @ \$40, tidewater.

Steel Rails.—A few small orders have been placed with Eastern mills, including one of about 2500 tons. Nothing of consequence is reported in Light Rails, which remain \$24 @ \$27, according to section. It is reported that some large transactions have taken place in Girder Rails and that financial matters are getting into shape to put through other work in the South which was suspended last summer. We continue to quote \$24 @ \$24.50 at mill for Girder Rails.

Track Material.—We quote as follows for small lots: Spikes, 1.65¢ @ 1.80¢; Fish Plates, 1.25¢ @ 1.40¢; Track Bolts, Square Nuts, 2¢ @ 2.30¢, and Hexagon Nuts, 2.20¢ @ 2.50¢, delivered.

Manufactured Iron and Steel.—The improvement in the volume of smaller orders continues, but fair prices are obtained on this class of work only for immediate delivery. The taking of the contract for the Richter Building on Broadway by an Eastern mill emphasizes the tendency which has developed during the past year, that some mills take orders for architectural work direct, for erection, thus going around the local architectural builders. On Beams the competition has practically narrowed itself down to two Pittsburgh mills, for any contracts of consequence. The parity of quotations there is 1.30¢, New York, for 13-inch. An order placed by a Delaware River Bridge works for 2000 tons of material for a New England structure was taken by Youngstown for the Angles and Pittsburgh for the Plates. There is quite a fair amount of work coming up, but prices continue extremely low in all lines. We quote: Beams up to 15-inch, 1.30¢ @ 1.50¢, for round lots; Angles, 1.20¢ @ 1.35¢; Universal Mill Plates, 1.15¢ @ 1.35¢; Tees, 1.40¢ @ 1.60¢; Channels, 1.30¢ @ 1.50¢, on dock. Steel Plates are 1.20¢ @ 1.30¢ for Tank; 1.35¢ @ 1.40¢ for Shell; 1.55¢ @ 1.60¢ for Flange, and 1.75¢ @ 2¢ for Fire Box, and 2¢ @ 2.25¢ for Locomotive Fire Box, on dock; Refined Bars are 1.30¢ @ 1.9¢, on dock, and Common 1.15¢ @ 1.30¢; Soft Steel Bars are 1.15¢ @ 1.30¢; Scrap Axles are quotable at 1.35¢ @ 1.50¢, delivered; Steel Axles, 1.35¢ @ 1.50¢, and Links and Pins, 1.40¢ @ 1.60¢; Steel Hoops, 1.45¢ @ 1.60¢, delivered; Cotton Ties, 65¢ @ 72½¢ @ 45-lb bundle, at mill; Machinery Steel, 1.25¢ @ 1.40¢; Toe Calk, 1.80¢ @ 1.90¢, and Sleigh Shoe, 1.60¢ @ 1.75¢, delivered.

Herr Lentz, in a paper read before the German Society of Engineers, makes the statement that there are 109,000 locomotives now in use in the world. He credits 63,000 to Europe, 40,000 to America, 3300 to Asia, 2000 to Australia and 700 to Africa. Of those used in Europe Great Britain owns 17,000, Germany 15,000 and France 11,000.

British Iron and Metal Markets.

[Special Cable Dispatch to The Iron Age.]

LONDON, WEDNESDAY, March 21, 1894.

Pig Tin prices went as high as £68. 15/ for prompt delivery, showing an advance of about £2 for the week. From that point there was a sharp reaction, due to free offers from the East, owing to weaker Silver market and local realizing of profits. A sharp recovery followed, under the impetus of firmer Eastern exchange. It is estimated that London stocks decreased 89 tons during the first half of the month in the face of heavy arrivals. The market closed firm with £68. 10/ quoted for prompts and £69. 5/ for three months' futures.

Copper has undergone very little change in prices, but the market shows rather firmer tone. The firmness is attributed to good local support and reduced American offerings. Outside speculation, however, continues very moderate. Quite a large quantity of metal changed hands quietly, and the supply is more strongly held. Sales of furnace material have been moderate, and there is very little available here now. About 2000 tons American argenterious were sold recently, on spot and to arrive, but prices are not divulged. European stocks of copper decreased 1349 tons during the first half of the month, and the visible supply fell off 1467 tons. This was due chiefly to reduced American shipments. Chili charters for the fortnight were 750 tons. At the close the market was quiet. Merchant Bars quoted at £41. 2/6 for prompt, and £41. 12/6 for three months' futures. Best selected English is about £44. 10/.

Some speculation in Tin Plate has been manifested, but limits on price were too low, makers being reluctant to sell largely ahead in view of the unsettled condition of the Pig Tin market. Home and export business has shown no improvement. Prices are still rather weak but show no positive change. Liverpool quotations are quoted as follows:

IC Charcoal, Alloway grade.....12/ @ 12/6
IC Bessemer Steel, Coke finish.....10/ @ 10/6
IC Siemens.....11/ @
IC Coke, B. V. grade, 14 x 20.....Nominal
Charcoal Terne, Dean grade.....10/ @ 10/6

Pig Lead has remained almost stationary in price at about £9. 2/6 for Soft Spanish, and demand has been moderate.

Spelter is quite steady at £15. 12/6 @ £15. 15/ for ordinary Silesian, with a modern business passing.

There have been no new developments in the Iron or Steel trades and the markets remain in quite uncertain form. Last sales of warrants were at 42/10 @ 43/ for Scotch, 36/ for Cleveland and 45/1½ @ 45/3 for Hematite.

From Gas City, Ind., comes the somewhat remarkable but, considering the times, very encouraging statement that skilled labor is scarce at the tin mills, the class of labor referred to being tin mill heaters. From the same source we learn that the Norwood tin plate plant is growing continually and the work of adding new mills is being pushed rapidly.

Causes and Cure of Hot Boxes.

At the last meeting of the New England Railroad Club, held in Boston February 14, the above subject was discussed, the opening address being by F. D. Adams. He said: The causes of hot boxes are various. First, excessive load. If we get too great weight upon a certain amount of bearing surface the friction produces heat ing. In old times the journals were very small. They have grown gradually larger. When they arrived at about 3½ x 5 inches it was supposed that they had been made abundantly large. In the Master Car Builders' Association we had quite a war of words in order to get the size of journals increased. Finally, by a compromise, we succeeded in getting adopted by the Master Car Builders' Association the 3½ x 7 inch journal. The mistake made at that time was that we did not get it larger. Since that time there has been a further increase of the size, but many old cars are in service and our freight men often load them without regard to the size of the journal, so that the hot box is no uncommon thing. The journal adopted for the present freight car is 4½ x 8 inches.

Brasses often are put in that are too rough. The style of brass that was adopted by the association at first with the 3½ x 7 inch journal, and I believe generally the same style of brass is adopted for the 4½ x 8 inch, is an octagon back. I have found in many cases—and this is certain to make a hot box—that the key was too narrow on the edge; in other words, the bearing was upon the edge of the key and not upon the back of the brass, preventing proper distribution of oil.

Another source of hot boxes is a very simple thing, improper packing. Many journals run hard because waste is packed so hard into the back part of the box that no oil will pass through it.

Perhaps the principal difficulty in all trouble with hot boxes is dirt and grit getting into the boxes. The old style of dust guard is often loose even when new, but when quite tight, they will soon wear. Even if the front is tight dirt and grit constantly work into the box through the back packing. If the box can be made so as to keep the dirt out absolutely, if it is properly oiled and well fitted, if the load is adapted to the bearing surface, and if the journal is of the proper size, there need be little trouble with hot boxes.

Two or three years ago Brother Launder made some elaborate tests as to the wear of journal brasses, and he came forward here with the statement that 1200 miles was considered good wear for an ounce of brass. It excited my curiosity a little and I went home and weighed 100 brasses and took the average of the 100 for weight of a new brass. Then I weighed a good many brasses that I had taken out, where I knew what the mileage was, and I found we were making about 3000 miles to the ounce, which was more than double his figure. We are making, on an average, for our passenger trains about 3500 miles to the ounce of wear. I did not look after the freight cars as it is very difficult to keep track of them. The best way to remedy hot boxes is, in the first place to have a tight oil box; make it tight at the back end and you won't get dirt into it. Use good oil and have the box properly packed with good waste. I am not much in favor of new lubricators, patent fixtures, springs, &c.

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HARDWARE.

Condition of Trade.

THERE is something of an improvement in the volume of business and a quickening in the general demand. The improvement is shown in the increase in the number of orders received by jobbing houses and manufacturers. The disposition to purchase in moderate quantities is marked and finds an illustration in the experience of a prominent File company, whose orders for the past few weeks considerably exceeded in number those of a corresponding time a year ago, though the aggregate amount of goods covered by them showed something of a falling off. The trade are purchasing seasonable specialties quite freely, this department of business being stimulated by the moderate weather which has recently prevailed. There are also indications of an improvement in the demand for Builders' Hardware, a line which has for some time been exceptionally quiet. There are few changes in price to note, but the tone of the market is weak and in many lines there is a tendency toward somewhat lower prices. This is especially the case in goods where there is considerable competition, the price of specialties which are made by only one manufacturer being more generally well maintained. In addition to the usual telegraphic advices from Chicago and St. Louis, we give below the letter from our Philadelphia correspondent which was omitted last week.

Chicago.

(By Telegraph.)

Shelf Hardware jobbers report a heavy increase in the demand for general Hardware, caused by the fine spring weather. Seasonable goods are moving freely. Builders' Hardware is not so active, but a great deal of building is going on, so that a much better trade in this line is certain later in the season. Staple goods are picking up again. Barb Wire is in especially good demand. The heavy Hardware trade also shows great improvement, although even yet the volume of business is much under the normal. The orders now coming in from consumers call for an unusual variety of sizes, showing that stocks have been completely used up. Collections are getting to be considerably better than they have been.

St. Louis.

(By Telegraph.)

Shelf goods are moderately active, while the demand for Builders' Hardware and Supplies is unusually heavy. During the money panic last summer and fall many buildings were left uncompleted. These are now being finished and Builders' Hardware is naturally receiving a small boom. The month of March has been unusually mild and much outdoor work has been done which ordinarily would not have been commenced until April 1 or thereabouts. The demand for Tin Plates is phenomenally heavy. A local manufacturer advises us that they are unable to turn out sufficient Black Sheets to meet the requirements of their tin plate works and are endeavoring to secure them outside to fill their orders. Galvanized Iron is also selling freely, but at prices that are lower than any yet named. In the way of seasonable goods such as Screen Doors, Wire Cloth and Garden Tools a good trade is reported. Collections are fair.

Philadelphia.

SUPPLIER HARDWARE COMPANY.—

Business continues within conservative limits, both buying and selling in fair and moderate volume. The wholesale Hardware merchants in this city, as a rule, are not starving their stocks, and so far as our own firm are concerned our shelves and warerooms were never better filled in assorted stocks, although no great overstock is piled away awaiting future results; but we permit no depletion of stocks owing to, or fear of, restricted trade. We hear of no great complaint regarding collections for purchases made since January 1, 1894, and while full recovery equal to the spring of 1893 is not yet visible, hopeful anticipations are not entirely abandoned. The industrial output of the surroundings of our city has increased somewhat. The present indications are an early spring, the effect of which will naturally draw upon season goods, of which there is no overstock in the hands of the retail merchant.

Our attention has been called to an article in *The Iron Age*, under date of March 15, on farm values. We have no positive knowledge of the special locations or, perhaps, narrow limits in the States referred to. We do, however, know that statistics show our general assertions are correct, and the writer had reason for making the assertion that not only four-fold, but in some instances far greater advances in farm land have taken place within the dates named, although it is a well-known fact that in some States farm lands were, a few years ago, held at unwarranted prices, when the large amount of cheaper lands is taken into consideration, just as "boom towns" have sold town lots, in anticipation, per-

haps, of manufacturing development, and a jump of 10 to 200 per cent. in the price of town lots has been frequently recorded; but declines soon followed, perhaps almost to the old figures. Railroads may have temporarily advanced farm lands in one location and for the same cause declines have taken place in others; advances may have occurred not warranted by the product of the soil and, therefore, further Western lands, perhaps with less extravagant tillers of the soil and more economical working, have given the far Western farmer an advantage.

In the writer's early experience in trade he has seen many and many a quarter section of Western land taken up at \$1.25 per acre, and before one-fourth of the acreage was in cultivation the purchaser has sold at a price which enabled him to buy a full section in further Western locations at the price at which he sold his quarter section. The advance in Western farms can be inferred from our remarks of how the owners have been enabled to unload their farm lands on investment companies, who have sent their agents out soliciting borrowed money on farm land mortgages. On the other hand, the writer has known cases in our own State where the owners of farms have made themselves rich between the price it cost them and the price they sold at, even to the second holders, whereas the third holders (perhaps less wise), having bought at unwarranted prices, doubtless would be willing to sell out at the same reduction referred to in the article mentioned. This is the case we see with manufacturing industries, and instances are recorded where manufacturers have deserted certain locations for other locations where they can continue business and live in competition from the fact of more favorable location and cheaper cost of production.

The railroad freightage is the one great and serious burden from which this country is now suffering. While the farmers are getting half the former prices for grain and other products, merchandise is being sold for far less than one-half the former price. Merchants are marketing their goods at an insignificant margin of profit.

Industrial enterprises are resuming business without a clearly defined policy of continuance. Manufacturers, in their rivalry for trade, have gotten prices to a minimum inconsistent with the amount of capital invested, and economy in all branches of trade is being established, but railroads are avoiding their share of the burden, and freight rates continue out of all proportion. The Interstate Commerce act is a cloak under which the railroads envelop themselves most effectually for their own convenience in maintaining the rate.

This is a large question, and of far greater importance than any tariff legislation which is now being discussed. The tax upon the consumer and the tax upon the farmer is simply out of all reason, and we regret to say is scarcely appreciated by those who are suffering, because they do not realize from whence the blow comes.

The corduroy road over which the entire trade, including the farming industry, has been traveling during the last eight months makes the railroad

freightage question a matter of vast and momentous importance.

Statistics intended for this article will be deferred until a later date.

Notes on Prices.

Wire Nails.—The excellent demand for Wire Nails which has prevailed for the past few weeks still continues, and the manufacturers are receiving many orders from the larger and the smaller trade. As a result, they are fully occupied, and in some cases are unable readily to supply the wants of their customers as promptly as desired. The market continues steady in the matter of price on the basis of \$1.10 for carload lots at mill, but it is understood that this figure can still be slightly shaded on especially large and attractive orders. The manufacturers, however, appear to be maintaining prices quite firmly, notwithstanding the fact that rumors are current of a weakness in the market, which we have been unable to verify. Small lots from store in New York are held at \$1.25 to \$1.30.

Chicago, by Telegraph.—Although rumors are in circulation of weakness in Wire Nails, there is very little evidence in sight here. The reduction in freights appears to have had more effect in lowering prices than an attempt to secure business by the manufacturers. The factories all seem to be full of orders, and they have been known to refuse positive offers at concessions from prices hitherto current. One large establishment was compelled during the week to put its machines on double turn in order to make prompt shipments to consumers, who have begun to clamor for deliveries on their contracts. Jobbers report a considerably better movement from stock. Under these circumstances it would appear singular if prices should weaken. Ordinary factory lots continue to be quoted at \$1.15, Chicago, while small lots from stock are selling at \$1.20 to \$1.25.

Cut Nails.—The demand for Cut Nails is fair, though not specially heavy, but manufacturers report an increased inquiry and the promise of a good business in the near future. The Eastern manufacturers are maintaining prices pretty steadily and adhering to their policy of quoting prices for Nails delivered at the principal points in their territory. The following are their quotations for carload lots delivered at the points named: New York, Albany, Boston and Savannah, \$1.05; Buffalo, \$1.02, and Harrisburg and Philadelphia, \$1. Concessions are made from the above prices in some instances on attractive orders or where the manufacturers come into competition with Western makers. The price from store in New York is \$1.15.

Chicago, by Telegraph.—Manufacturers report about the same condition

of affairs as stated during the past three or four weeks. The demand is considered quite good under the general trade conditions and the distribution of Cut Nails is still spreading over a wider area. Prices are as before on the basis of \$1.05, Chicago, factory for lots on 60-cent average. Small lots from stock are selling at \$1.15.

Barb Wire.—A very satisfactory condition is reported in the Barb Wire market, both in the matter of price and demand. The volume of business is large and the mills are full of orders, so much so that in some cases they are unable to make shipments with sufficient promptness to meet their customers' requirements. Prices are steadily maintained on the following basis: Carload lots of Galvanized Four-Point, Pittsburgh, \$2.15; Cleveland, \$2.20; Cincinnati or Allentown, \$2.25; Chicago or New York, \$2.35, with an advance of 5 cents per 100 pounds in less than carload lots.

Chicago, by Telegraph.—Manufacturers report a great deal more inquiry for Barb Wire, as well as plain Wire. They are exceedingly gratified at the manner in which orders are coming in and report stiffer prices. The trade this spring is of a peculiar character. Large buyers were conservative early in the season and refrained from placing orders in the usual way, and they are now sending in frequent orders for small lots by mail and telegraph, which keep the manufacturers much busier than if they were making regular shipments on large contracts in the old way. This also entails annoyance to the purchasers, who, of course, are not receiving the goods as promptly as they would like. If the movement continues, as from present appearances it will, the largest manufacturers will in a short time be completely overwhelmed with business. Quotations are \$2.35 to \$2.40 for small lots of Barb Wire from stock, and \$2.25 to \$2.30 for carloads.

Cabinet Locks.—There is a good deal of irregularity in prices, and quotations are considerably lower than heretofore. This is owing principally to new competition which has recently entered the market on this line. As a result a discount of from 50 per cent. to 50 and 10 per cent. is readily obtainable.

Wrought Iron Pipe.—The volume of business in Wrought Iron Pipe is reported fair, but competition between the manufacturers is active, and as a result prices have settled to a comparatively low level, concessions being freely made on large orders.

Rope.—The demand for Cordage generally is light and prices are irregular and somewhat weak. Quotations are on a basis of 6½ cents for Manila, 5 cents for Sisal and 5 cents for New

Zealand, slight concessions being sometimes made, but only on especially large lots.

Colt's Revolvers.—Colt's New Pocket Double Action Revolvers, manufactured by Colt's Patent Fire Arms Mfg. Company, Hartford, Conn., and illustrated in *The Iron Age* March 15, 1894, are sold in either nickel or blue finish at the following net prices:

	Each.
2½ inch Barrels.....	\$10.00
3½ " "	10.00
6 " "	11.00

Pocket Oilers.—The *Ægis* Pocket Oilers, illustrated in *The Iron Age* March 15, 1894, and manufactured by the Scovill Mfg. Company, Waterbury, Conn., are sold, either style, at \$8 per gross, net.

Pruning Shears.—Cronk's Pruning or Hedge Shears, manufactured by Cronk Hanger Company, Elmira, N. Y., a description of which was given in our issue March 15, 1894, are sold in 26-inch, with wood handle, at \$12 per dozen, less a discount of from 33½ to 33½ and 10 per cent.; and in 8-inch Pruning Shears at \$12 per dozen, less 33½ per cent. discount.

Watch Carrier.—Burleigh's Bicycle Watch Carrier, manufactured by Geo. K. Burleigh, Tilton, N. H., and illustrated in *The Iron Age* March 15, 1894, is sold at 75 cents each, or with a 2-inch clock at \$2 each, from which prices a discount of 33½ per cent. is allowed.

Relief Wringers.—Relief Wringers, manufactured by the American Wringer Company, 99 Chambers street, New York, and illustrated in our last issue, are sold at the following prices, which are subject to a discount of 2 per cent. for cash in ten days:

Without Cog Wheels.		
No.	Size of Rolls.	Per dozen.
2....	10 x 1¼.....	\$20.00
3....	11 x 1¼.....	24.00
4....	12 x 1¼.....	28.00
5....	14 x 1¼.....	37.00
6....	16 x 2.....	46.00

With Cog Wheels.		
No.	Size of Rolls.	Per dozen.
22....	10 x 1¼.....	\$22.00
33....	11 x 1¼.....	26.00
44....	12 x 1¼.....	30.00
55....	14 x 1¼.....	39.00
66....	16 x 2.....	48.00

Glass.—While there is little if any improvement noticed in the demand for Window Glass, there is a reported tendency toward firmer prices by manufacturers than for some time past. It is understood that 88 per cent. discount for single, and 90 per cent. discount for double strength Glass, prices that have been offered by Western manufacturers and jobbers, are not now obtainable. Pittsburgh quotations remain the same as last week—85 and 10 and 5 per cent. discount for single, and 85 and 20 per cent. discount for double strength Glass. Plate Glass is still sold at very low prices owing to the sharp competition between manufacturers.

Prize Competition.

Bicycles in the Retail Hardware Store.

THIRD ARTICLE.

BY LOUIS H. HALL.

Speaking from the standpoint of country or small city trade, the retail Hardware store is the most natural place in which to find Bicycles and accessories. One would hardly look anywhere else for them, except in a regularly appointed Bicycle store, which, as a matter of fact, does not pay financially in country trade, and therefore is not a thing to be counted on. While many makers are represented by agents, it has been my experience that a stranger in town having met with an accident to his wheel will in nine cases out of ten go at once to the Hardware store, trusting to find there some one who can help him out of his dilemma—simply because it is perfectly natural for him to do so. Manufacturers are realizing more and more every year that through reliable Hardwaremen is the safest and deepest channel for the disposing of their product. And surely the retail Hardwareman will not seek to divert to other lines of trade what can so readily be made a profitable branch of his own.

Learn It.

While the average retail Hardware dealer is sometimes loth to take hold of the business, it is usually because he knows practically nothing about it and is fearful of making a failure of it. To such I would say, Learn it. You can as well as your neighbor. Or if you are so situated that you cannot devote your own time to it, put it in the charge of a zealous, hustling clerk who is a good salesman and, best of all, an enthusiastic practical wheelman. Let whoever has charge of it have the whole charge of it and be thoroughly posted on everything in the cycle line. Let him as much as is possible wait on all customers in that department. With a wide awake, practical man at the head of the Bicycle department, a retail Hardware store is an ideal place to handle the country Bicycle trade, and that department is sure to be a profitable part of the store.

A Bicycle Department.

In many Hardware stores a difficulty arises in the lack of necessary room to properly display the stock, for a Bicycle department will take up room. But the average Hardwareman has enough ingenuity to enable him to find room somewhere in his store for so attractive an adjunct to his regular business. The front part of the store is usually the most satisfactory place for a Bicycle department, and is better still if there be a chance for a good window display.

By all means display your wheels. Don't keep them in the back part of the store to be trotted out when a possible customer comes in.

Amount of Stock.

Naturally, the amount of stock to be carried will be a question to be carefully considered, same as in the various other lines of stock to be found in every Hardware store. The only practical rule I have found is, to carry an amount of stock proportionate to the amount of trade. Do the same in the Bicycle department as regards amount of stock as you would do in the rest of your business. Samples, at least, of your leading wheels should be carried. Care should be taken not to overload, especially in second hand wheels, late in the season. It has been my fortune to reach the end of the season always without a wheel except the one I have ridden. In many places that perhaps is a rare occurrence, but it is my advice to come as near to it as is possible, for wheels, second hand ones especially, depreciate in value so much from one season to another that it is unprofitable to carry over many of them. A stock of sundries or accessories is a necessity in connection with the stock of wheels, and their sale is a pleasant part of the business. They afford a very good percentage of profit, and are less liable to decrease in value from one season to another than wheels are.

In the selection

of the line or lines of wheels there are two or three things deserving of consideration. In order to avoid, as far as possible, vexatious delays in replacing broken or defective parts and making repairs, one should not try to deal with a maker or dealer in a distant part of the country. Deal as near home as is possible to secure satisfactory lines of wheels. Also deal with makers who are of undoubted financial responsibility and who give a guarantee with every wheel that means something—a guarantee you are sure will be lived up to. Handle lines of wheels that are popular in your section. It is easier to sell them and at the same time sell more of them. Don't try to carry too many lines of wheels. Two are better than one in order to get a satisfactory range of prices and models, for while one firm may manufacture a very excellent line of strictly high grade machines, that line will need to be supplemented in retail trade by another firm's line of medium or low priced wheels. I should advise no one in country trade to attempt more than three different lines.

A Repair Shop

in some way or other is, at least, desirable, and I deem it a necessity, no matter how small the trade. The amount of your trade will determine whether you run a repair shop of your own—which, of course, is somewhat expensive if thoroughly fitted up—or make an arrangement with a good practical mechanic and machinist to do your repair work in his own shop.

In my experience, with a comparatively small trade, the latter way has been the most satisfactory.

Headquarters for Everything.

Keep the fact that you are in the cycle line well before the public by judicious advertising. During the season use frequently for that purpose your space in the local paper; or, better still, get extra space for a short time, and use it exclusively for your Bicycle advertisements. Whichever way you do, make your advertisements short and spicy and change them often. In making them up use the cuts which can be obtained from the makers of your lines of wheels. Use in a free but not wasteful manner the catalogues and other advertising matter sent you by the manufacturers. Be persistent and pushing in all your advertising, and if you have the right wheels at the right prices, you can hardly fail to create a demand for them larger than would otherwise exist.

Courteous Attention.

Treat with equally respectful care and attention the customer for one of your best wheels, and the customer who comes asking you to give him advice in regard to some simple thing concerning his wheel. In short, conduct the business in a business like manner, and I am confident it will be found a pleasant and profitable addition to the regular trade of any retail Hardwareman.

Manufacturers' Association of Kings and Queens Counties.

THE MANUFACTURERS' ASSOCIATION of Kings and Queens Counties held another meeting Tuesday evening, March 20, at the Union League Club, Brooklyn, for the purpose of effecting a permanent organization. The following officers were elected: H. B. Haigh, president; William H. Nichols, first vice-president; Ernest C. Webb, second vice-president. In addition to the six directors elected March 6, for the purpose of incorporating the body, the following gentlemen were chosen to complete the board: D. R. Morse, Thos. C. Smith, John H. Hanan, Robert Dunlap, John H. Schuman, F. W. Wurster, D. M. Somers, E. W. Bliss, J. Adolph Mollenhauer, A. G. Jennings, F. J. Logan, Cord Meyer, Jr., William Vogel, C. N. Chadwick. The balance of the board consists of H. B. Haigh, Lowell M. Palmer, William H. Nichols, E. Dwight Church, Walter L. Pierce and Ernest C. Webb. The Committee on Organization reported that the necessary formalities had been complied with and a certificate of incorporation obtained. The Committee on Constitution and By-Laws reported progress and asked for an extension of time. There were about 130 present, representing many of the largest manufacturers of the two counties; while many others, unable to be present, signified their intention of joining the association. The following committees were appointed by the Chair: Committee on Insurance: D. R. Morse, D. M. Somers, F. W. Wurster.

Committee on Boiler Inspection Bill now pending in the Legislature: James C. Hoile, William Brookfield, G. W. Kenyon.

Committee on Better Shipping Facili-

ties from Express Companies: R. W. Bainbridge, Robert Dunlap, John H. Hanan.

The next meeting will be held April 3, same time and place.

The Department vs. the Hardware Store.

A HARDWARE JOBBER, himself an advertiser of some prominence, sends us the following letter upon a topic that is necessarily of great interest to every retail Hardwareman:

There is one advantage the department store has over the regular store that must always be considered in discussing the antagonism between the two; that is, its keeping abreast of the demands of the day. How are these demands created? By advertising. How are these demands anticipated? By keeping hold of the public pulse. Don't the regular dealers do this? They do not, by a very large and overwhelming majority. The regular Hardware retailer sees my advertisement of a new Screw. He smiles at it. "Tisn't quarter as good as the old one!" Some day one of his customers comes to him with one of my advertisements and asks if he has this Screw. No, and he doesn't want it; has a good deal better Screw in stock. He may convince that man, but the next is not ready to take his word for it, and as he can't get it there, tries elsewhere, eventually, perhaps, writes his experience to me. I write the dealer, making him a good offer to lay in a little line of my goods, but he is too thick headed to be influenced by correspondence, and eventually I offer the consumer a small lot at a cut price to get my goods started in that town.

The department store buyer is a man of another caliber. He sees that a certain article is being advertised so as to be thoroughly well known. He wants to utilize that advertising. He buys a bill of the goods, announces that he will undersell the maker, draws the trade of every one who has been interested in the manufacturer's advertising, and is looked upon as a public benefactor for cutting down the price.

The regular Hardware dealer is slow to order from an advertisement. He wants to be called on, shown samples, argued with and coaxed into buying a bill. A consumer wrote me: "I went into eight Hardware stores and asked for your goods. None of them had them or would admit that there was any reason why they should have them. All of them had something better, or as good!" I sat down and wrote these dealers, inclosing my list, making a low price, and calling their attention to the fact that their own customers were writing to me for these goods. Not a word of reply or recognition came back. Then I worked up a good trade with consumers direct, and I heard, in a roundabout way, that two of these shrewd dealers grumbled that I was a fool to suppose they would buy my goods when I was selling direct to their customers!

I can call upon the buyer of a department store with the feeling that he will have seen my advertisement, and will show some interest in the goods, whether he buys or not. Yet, although I am a general advertiser to a certain extent, I am prepared to have the Hardware dealer tell me that he never heard of or saw any of my advertising, and to act as if he would rather stop the interview right there. There are a great many good paying, ready selling articles that properly belong to the Hardware stock that are being pushed and sold entirely outside of the trade because of the coldness with which the Hardware dealer responds to the calls made upon him for advertised goods.

Spring and Summer Goods.

BY WM. TODD, JR.

THE NEAR APPROACH of spring and summer has a tendency to create an ambition among business men to outdo their competitors in the arrangement of their goods and for an increase over their last year's sales. A number of people are not cognizant of the approach of spring, and they must be notified of its coming. Some merchants have a

SPRING OPENING

which is advertised to take place on certain days, and quite an attempt is made to display their goods advantageously. Another plan is to distribute introductory pamphlets with subjects something like the following: Hints for Spring; Hot Weather Suggestions; Summer Comforts, &c. This book may assume the nature of a price-list. The different kinds of goods are illustrated and some comments made upon them, which is often very effective.

Goods that have been left over from the previous season should be looked after while being stored away and kept as bright and new appearing as possible. No person can detect the difference between them and new goods if kept in this condition. They should, however, be placed in the most conspicuous place in the store when offered for sale, and with a little

EXTRA PUSH

they can be disposed of as quickly and as easily as new goods. The question of knowing when to buy goods depends somewhat on the location of a place. In localities where one buys goods from hand to mouth they can be purchased in such quantities as may be desired without laying in an enormous stock at certain periods of the year, as is the custom where places are not in close proximity to large cities. The nearer the place is to large cities the greater the competition, and goods can be bought at much closer figures as a result of competition.

AMOUNT OF CAPITAL.

The buying of goods may also depend upon the amount of capital a man has.

If a man has plenty of ready capital he should buy when the trade is dull

and when business is very quiet; then the wholesale trade are more anxious to sell and a number of concessions in prices can be obtained which otherwise could not. Unseasonable goods should be carefully stored away so as to be of easy access, and should be put in such a place as not to be in the way of seasonable goods.

Garden Tools, Farming Implements, Lawn Mowers, Refrigerators, Ice Chests, Coolers, &c., should be given the preference in

SPRING AND SUMMER,

and placed in the most prominent parts of the store. For instance: Our Ice Cooler is near the center of the store, one of them having a placard marked as follows: "This standard make of Ice Cooler for sale here." We have plenty of water and good ice in this cooler at all times, and it is surprising to know the quantity of coolers we sell by this simple advertisement. Our Shovels, Rakes, Hoes, Forks, Handles, &c., are displayed on a movable tool rack, which at this time of the year is placed on the pavement for show.

OUR WINDOWS

are decorated with Carpenters', Plasterers', Bricklayers' and Masons' Tools, together with numerous other seasonable goods. On a signboard which is placed outside of the door is printed an invitation for the people to walk inside and inspect our spring and summer goods. Our seasonable goods are carefully arranged in the most conspicuous part of the building, plainly marked, and the people cannot possibly pass by them without looking over the stock, and they invariably see just the thing they have been wanting.

WE TRY TO HAVE IN OPERATION

through the summer a gas, gasoline and an oil stove. This is an advertisement which excites the greatest sensation among the people, and it does not require much persuasion among them to have quite an audience at all times taking in all the points of explanation. One show window that attracted considerable attention was arranged in the following manner: We had the figure of a farmer in the center and surrounding him were all the tools that he would need in the spring and summer. We always had plenty of sightseers and our rural district trade increased wonderfully. This novelty in window dressing is certainly a grand advertisement.

PRINTED IMITATIONS

of railroad tickets announcing spring and summer goods and distributed through the streets are sure to bring profitable results. Refrigerators and Ice Chests are placed on movable trucks, and any piece of furniture desired can be displayed from any point of view the customer desires. It also enables the sweepers to keep the floors cleaned without much trouble. Spring and summer is the opportune time for all merchants to display their ingenuity in the arrangement of their goods so as to compare favorably with any other man's business in the same locality and help to maintain the reputable opinion of the place.

THE Boston Dinner.

New England Iron and Hardware Association.

THE FIRST annual dinner of the New England Iron and Hardware Association, which was given on Tuesday evening, March 13, in the banquet hall of the Parker House, Boston, was in all respects a complete success and was greatly enjoyed by the guests. Much credit is due to the Dinner Committee, consisting of CHAS. C. ADAMS, CHAS. H. BOLLES, E. LORING RICHARDS, CHAS. A. BURDITT and H. C. BANGS, for the care and thoughtfulness shown in making and in carrying out the arrangements, thus securing the pleasure of the guests and the success of the banquet.

Reception.

Before the dinner a reception of an hour was held, at which the guests, nearly a hundred in number, had the pleasure of meeting one another and of being presented to the Governor of the State, who was the honored guest of the association. This opportunity for social intercourse was much enjoyed, as not only were Boston merchants brought together, some of them meeting one another for the first time, but representative merchants and manufacturers also from other parts of New England, as well as from New York and Philadelphia. When the time allotted for the reception had elapsed, and in view of the cordiality which characterized it, it would have been pleasant had it been prolonged, the guests, headed by Samuel A. Bigelow, president of the association, and Frederic T. Greenhalge, Governor of the State, entered the dining room, where seats were assigned them according to the diagram herewith given. It will be observed that the Boston Iron and Hardware houses were largely represented by their leading members, as well as the other New England jobbing houses and many prominent manufacturers. An inspection of the diagram, in which the names of the individual guests are given, will show that the following houses were represented:

BIGELOW & DOWSE CO.
VAN WAGONER & WILLIAMS CO.
SARGENT & CO.
HENRY DISTON & SONS.
C. F. FAIRBANKS.
CLINTON WIRE CLOTH CO.
BOLLES & WILD.
JOHN WALES & CO.
STANDARD CO.
EDWARDS & WALKER.
H. O. STRATTON.
FAYETTE R. PLUMB.
JOSEPH BRECK & SONS.
YALE & TOWNE MFG. CO.
PLUME & ATWOOD MFG. CO.
DANA HARDWARE CO.
STANLEY RULE & LEVEL CO.
DODGE, HALEY & CO.
ATLAS TACK CORPORATION.
EMERY-WATERHOUSE CO.
H. A. WINSHIP.
ELDRIDGE, WINNEK & IRVING.
BALDWIN, ROBBINS & CO.
BROWN & WALES.

BUTTS & ORDWAY.
OLIVER AMES & SONS CORPORATION.
FRYE, PHIPPS & CO.
CHARLES PARKER CO.
H. C. HARVEY & CO.
CONGDON, CARPENTER & CO.
KEARNEY & FOOTE CO.
AMERICAN SCREW CO.
WOODROUGH, MANSFIELD & CO.
E. P. SANDERSON.
FITZ, DANA & CO.
PECK, STOW & WILCOX CO.
STANLEY WORKS
M. C. WARREN & CO.
BURDITT & WILLIAMS.

Among the guests were also representatives of the following papers: Boston *Commercial Bulletin*, Boston *Globe* and *The Iron Age*.

The Dinner.

After grace had been said by Rev. William H. Bolster, a most excellent dinner was served. The menu or souvenir was tasty and artistic, the different pages comprising it being secured by silk ribbon, the ends of which were gracefully tied on the front cover, the chief feature of which was the reproduction of a dinner scene, an illustration being also given of several Hardware articles. The menu presented the usual data in regard to the dinner, giving the menu and toast list and the names of the officers of the club and the members of the Dinner Committee. The page devoted to the menu itself was embellished with an illustration in which leading Hardware devices were represented. The closing pages were designed for the accommodation of autographs, a feature which was quite generally utilized by the guests, the whole constituting a pleasant souvenir of the occasion.

At the conclusion of the dinner the company was called to order by Samuel A. Bigelow, the president of the association, who presided with grace and dignity. In the following appropriate address, which was listened to with the closest attention, and greeted with frequent applause, he introduced Charles C. Adams as toastmaster:

In behalf of the New England Iron and Hardware Association it gives me pleasure to express our love and loyalty to the Governor of our State, and our thanks to him for his presence with us to-night. To our other guests representing the Church, the press, the merchants and the manufacturers, I also extend a most hearty welcome at this our first annual dinner.

It is not quite one year since this association was organized. Why the Iron and Hardware interests never before had a distinct organization is hard to understand. Perhaps there might have been a feeling of independence or a lack of confidence in the past, but that every difference of this kind has now been happily surmounted must be plain to all present here to-night. We add to our individual strength and power by uniting all the Iron and Hardware interests of New England in one organization, which shall always be in close touch with similar associations in other cities. We believe we can accomplish results as a body that will elevate our trade and bring it into the prominence to which it is entitled through the magnitude of its interests, and we have this aim in view.

Few perhaps realize the importance and extent of this branch of the industrial world. Thinking it might be of general interest, at the last meeting of the association, by vote, the secretary

was instructed to send a circular letter to each firm having a membership, asking them to give the amount of their yearly business and the tonnage of Iron and Hardware they annually distribute in New England. The returns to this circular are too incomplete to give you these amounts to-night, but I am sure that with them we can readily establish the power and influence our organization may rightfully claim.

From time immemorial these interests have deserved and have obtained the highest recognition among all classes of men. When the Temple at Jerusalem was completed King Solomon gave a feast to the artificers employed in its construction. On unveiling the throne it was found that a smith had usurped the seat of honor, not yet awarded, on the right of the king, whereupon the people clamored and the guard rushed to cut him down. "Hold, let him speak," commanded King Solomon. "Thou hast, O King, invited all craftsmen but me. Yet how could these builders have raised the Temple without the tools I fashioned?" "True," decreed Solomon, "the seat is his of right. All honor to the iron worker." From that time till now our trade has pursued the path of usefulness and honor.

It is in the memory of you all that Joseph B. Eaton by his munificent bequest lent material aid to that noble and useful institution, the Young Men's Christian Union. Oakes and Oliver Ames by their enterprise and undaunted resolution accomplished the task of building the first transcontinental railroad (the Union Pacific). Peter Butler was an able assistant in financing the project. John F. Macomber was public spirited and did good service during the war in furnishing the navy and working night and day in doing his part in fitting out the Butler expedition which captured New Orleans. In fact, Iron and Hardware men have always been earnest and willing supporters of the Government. Such men as the Distons of Philadelphia and Andrew Carnegie are pillars of undoubted strength. To convince ourselves that talent of the highest order has owed its origin to our friends and comrades we have only to remember that the father of the late Bishop Brooks was a Hardware merchant.

It would be easy to cite other instances where Iron and Hardware men have been noble, generous and faithful, but I will not keep you longer. I wish to extend to the Entertainment Committee the thanks of this association for the pleasing results that their arduous and untiring labors have allowed us to enjoy to-night. Not satisfied with arranging the details of this entertainment, their chairman has kindly consented to act as your toastmaster. I have the pleasure of introducing Charles C. Adams.

The Toastmaster.

The wisdom of the selection of Mr. Adams as toastmaster was abundantly shown in the felicitous manner in which he presented and introduced the several speakers. Much merriment and good feeling was provoked by the many happy hits which he made, and his ease and humor contributed not a little to the enjoyment of the occasion. The toast list, which, with its mottoes, is reproduced herewith, was long, but the speakers considerably acted on the suggestion of the toastmaster that their remarks should be brief. The result was that all the addresses were listened to with the closest attention, and the company separated at a comparatively early hour.

and full rights, more than the strength of princes, whether they be of blood or iron or of any other substance. I look, therefore, to this first annual dinner, Mr. President, of your organization with a good deal of hope, with a good deal of expectation and faith, and I know that expectation and that faith will be justified. You meet here 90 or 100 strong, possibly. You meet here men of all political parties, of all religions, I presume. I hope we have every kind represented here. If we have only one minister, at least we imagine that all the others might be, if they had not gone into the Iron and Hardware trade. I know, I say, that this organization will, by these annual meetings, bring about good, not only to themselves but to the various cities and States and Commonwealths which they represent, and so, as a necessary consequence, to the whole country which we all love, from lake to gulf and from ocean to ocean, the beloved country of the United States. I thank you, gentlemen, for your kindness.

Hon. Jonathan A. Lane, president of the Merchants' Association of Boston, was the next speaker, his subject being

Our Industries.

I suppose this cordial greeting is due partly to the Merchants' Association and partly to the sentiment to which I am expected to speak. I am certainly very highly complimented with being present at your first banquet. I have looked at your proceedings with a great deal of interest. We of the Merchants' Association think we do this thing pretty well, but I think we can take a point or two from you at the beginning, and I congratulate you on making so good a start. After you have lived as long as I have, gentlemen, you will have found out that these mercantile organizations go a long way toward making business a pleasure as well as a profit. The old jealousies and animosities which used to take possession of business men when I was young seem to have been banished entirely. These mercantile organizations bring us together in good fellowship. Our cause is to some extent a common cause. We stand on common ground. We are a band of brothers, and if any one interest comes to grief we all feel depressed, if any interest prospers we all share in that prosperity. And so it is, gentlemen, with the sentiment to which I am to say a word or two. Our industries bring us on to common ground, our cause is a common cause.

The country at the present time is confronting a very exceptional state of things. Political systems are conflicting with each other. We have about three schools of political economy in our land. We have the American policy, so-called, under which we have lived for about a generation; we have the tariff reformers' theory of things, which seems to be expressed in the pending bill; we have the free traders, who are growing stronger day by day. It would be a good thing if we could sometimes get out of ourselves and out of our parties and out of our opinions and out of our convictions, and, if possible, look at these things from an entirely outside point of view and watch the results of this great conflict going on in our own country. I confess that I do look upon it with a good deal of interest, and when it was suggested that I should say a word or two upon your Iron interest, I could not but think of the eloquent ex-Governor of this Commonwealth, who has discoursed considerably upon that theme in his various political peregrinations through the Commonwealth. We have two eloquent Governors here of recent date—Governor Greenhalge and ex-

Governor Russell—and you know that Governor Russell has made many a good point when he has referred to the Iron interests of this Commonwealth. Sometimes on a minor key, in somewhat a doleful strain, he has pictured the great decadence which had come upon your industry by virtue of a bad economic system, and then again he has, in brighter colors, pictured the good time coming when, under Democratic rule, we should have a better fiscal system, a better economic system, and the Iron industry in this old Commonwealth should revive and you would have a great jubilee in Bridgewater and Weymouth and

ment, as I said, in the Iron interest. That is the end to which we have been looking forward with great satisfaction. When my friend Mr. Wilson reported his bill, I thought that indicated the good time was coming. Recently the news from the Senate does not seem to indicate exactly that you are going to have free coal and free Iron, and I am not quite so sure, gentlemen of the Iron interests, that the good time is coming so soon as we were expecting it. But without regard to that, I am very sure that, whatever economic system shall come to the front in this country, neither of us is going to the wall. I don't believe that the woolen mills are

TOASTS.

1.—The Commonwealth.

Gov. FREDERIC T. GREENHALGE.

"Boston State House is the hub of the solar system. You couldn't pry that out of a Boston man, if you had the tire of all creation straightened out for a crowbar."
Autocrat of the Breakfast Table.

2.—Our Industries.

Hon. JONATHAN A. LANE.

"A common cause—we will stand or fall, we will survive or perish—together."
Anon.

3.—Pen and Sword.

Gen. CHARLES H. TAYLOR.

"I'll make thee glorious by my pen,
And famous by my sword."
Marquis of Montrose.

4.—Early Hardware Manufactures in New England.

Hon. J. B. SARGENT.

"I saw a smith stand with his hammer, thus,
The whilst his iron did on his anvil cool."
King John.

5.—The Causes of the Business Depression.

E. BENJAMIN ANDREWS, LL.D.

"We must take the current when it serves,
or lose our ventures."
"Oh, that a man might know
The end of this day's business ere it comes."
Julius Cæsar.

6.—A Friend from Gotham.

Mr. WILLIAM H. WILLIAMS.

"Halt! Who goes there? A friend!
Advance, friend, and give the countersign."
U. S. Army Rules.

7.—Business Men in Politics.

CURTIS GUILD, Jr.

"Nobody can be healthful without exercise, neither natural body, nor politic."
Lord Bacon.

8.—Strength vs. Keeness.

Rev. WM. H. BOLSTER.

"If the iron be blunt, and one do not whet the edge, then must he put on more strength."
Ecclesiastes, x. 10.

9.—The Civil Service as a Career.

Mr. HENRY A. THOMAS.

"The sun, which passeth through pollutions, and itself remains as pure as before."
Bacon's Advancement of Learning.

10.—The Joys of an Editor.

Mr. RICHARD R. WILLIAMS.

"Joys too exquisite to last,
And yet more exquisite when past."
The Little Cloud.

"To all, to each, a fair good night,
And pleasing dreams and slumbers light."
L'Envoi.

Wareham and these towns that have come to grief so sadly during the years that have gone by. I have, of course, being in the woolen interest, expected to find myself in the soup about as deep as any body, and in looking about to see where I could find a crumb of comfort, I have looked upon the Iron interest and its revival as one of those things that is going to cheer us all. You know, gentlemen, we stand together. Your interests and your industry is about as old as ours. I think it would rather puzzle any scholar or antiquarian to tell which is the oldest, the Iron interest or the wool interest, and it would be a great thing if, in this reconstruction of our economic system, we should find in the Commonwealth of Massachusetts possibly some little decadence in the woolen traffic, but a great improve-

going to close up entirely; I don't believe the Iron interest is going to perish out of our land. These two great interests must necessarily, gentlemen, be preserved, and they will be preserved, and we shall take a great deal of satisfaction, I think, in the strength and prosperity which you or I or all of us will ultimately realize in spite of the apparent decadence which has come upon us.

More and more, gentlemen, it is impressed upon me, as the sentiment to which I have endeavored to speak declares, that our interests are common, that in this whole business we stand together, that the prosperity of our country is a prosperity in which we are all linked and bound together. We shall none of us come to awful and unmitigated grief and disaster, but we shall so stand by each other, I think,

that we shall be sure not to fall. We shall not sink, but we shall swim; and we shall not perish, but we shall survive. I am very much obliged to you, gentlemen, for the compliment of being present here this evening and I congratulate you upon making so beautiful a start in this social arrangement, and I assure you, if your experience is that of other mercantile organizations, you will never regret having added to the almost numberless organizations in Boston the one with which you are identified.

hood up I cherish as I would cherish the apple of my eye. The beauty of organizations like this is that you make friendships. Your competitor who is on the other corner, that you thought was a pirate and a fraud and ought to be shot, when you come to sit at the table with him, take a glass of wine with him, you find to be a witty, good fellow, perhaps better than you are in some points. Organizations like this rub off the rough points of life and bring out the best things there are in men. I tell you,

for three years, one of the greatest sufferers in this country, but as patient and as jovial and as genial as he was when, as the head of a Hardware concern, he was doing the largest business in this country. I mean the Hon. Peter Butler. I propose his health.

The guests then, in accordance with General Taylor's suggestion, rose and gave their tribute of respect to Mr. Butler, who is evidently held in high regard.

	E. Benj. Andrews, LL.D.	Hon. Jonathan A. Lane	Gov. F. T. Greenhalge	Samuel A. Bigelow, President	Rev. Wm. H. Bolster	Wm. H. Williams	Curtis Guild, Jr.	
Hon. Jos. B. Sargent	O	O	O	O	O	O	O	Chas. C. Adams, Toast Master
Richard R. Williams	O							Henry A. Thomas
Samuel Disston	O	O	C. H. Breck			F. H. Butts	O	Gen. Chas. H. Taylor
C. F. Fairbanks	O	O	L. C. Carter			Oakes A. Ames	O	W. C. English
R. R. Bolles	O	O	C. L. Mead			C. F. Dowse	O	E. L. Haley
John Wales	O	O	H. C. Dodge		S. Lawrence Bigelow		O	J. K. Whipple
Dalton Fallon	O	O	J. H. Parks			Hobart Ames	O	J. N. Frye
T. W. Brown	O	O	S. T. P. Martin			F. M. Smith	O	J. H. Willets
Frederick Walker	O	O	W. Chamberlin			John Chase	O	A. M. Wiley
H. O. Stratton	O	O	E. H. Wightman			C. H. Parker	O	E. J. Neale
F. R. Plumb	O	O	James Denny, Jr.			A. J. Chase	O	H. C. Ordway
G. Lewis Sargent	O	O	H. A. Winship			J. H. Robbins	O	L. H. Pease
Chas. E. Adams	O	O	R. Westacott			W. A. Hopkins	O	T. H. Baldwin
Luther Adams	O	O	C. O. Dewey			A. C. Harvey	O	A. H. Decatur
C. H. B. Breck	O	O	Jesse C. Ivy			H. C. Bangs	O	G. F. Blake, Jr.
J. B. Hunter	O	O	W. F. Bacon			John H. Congdon	O	G. J. Mulhall
A. T. Young	O	O	A. L. Harwood			J. D. Foot	O	M. McBarron
W. F. Donovan	O	O	W. N. Irving			J. A. Nealey	O	H. G. Janyrin, N.E. Hardware Dealers' Association.
J. E. Bacon	O	O	C. H. Eldridge			E. H. Mansfield	O	J. C. Kennedy
F. E. Parker	O	O	Henry Brooks			E. P. Sanderson	O	W. E. Plumer
Press	O	O	J. G. Brown			E. L. Richards	O	D. Arthur Brown
	O	O	Joseph Williams				O	Charles E. Stumcke
	O	O	C. H. Bolles			Press	O	
	O	O	Press			Press	O	

DIAGRAM OF TABLES.

From the speech of Gen. Charles H. Taylor of the Boston *Globe*, whose toast was

The Pen and Sword,

we make the following extracts, regretting that the pressure on our space will not permit our giving more of his admirable address :

I am glad that you have organized this club. The toastmaster said something about friendships. To me the friendships that I have are better than money or anything else that I have in life, and those friends from my boy-

hood up I cherish as I would cherish the apple of my eye. The beauty of organizations like this is that you make friendships. Your competitor who is on the other corner, that you thought was a pirate and a fraud and ought to be shot, when you come to sit at the table with him, take a glass of wine with him, you find to be a witty, good fellow, perhaps better than you are in some points. Organizations like this rub off the rough points of life and bring out the best things there are in men. I tell you,

One of the most interesting and valuable addresses of the evening was that of Hon. J. B. Sargent, who spoke on

Early Hardware Manufactures in New England,

a subject to which he has given much attention. We are gratified to be able to give his address in full :

The birth of the manufacture of Hardware in New England was in the village blacksmith's shop and we may well say, in the words of Longfellow : "Thanks, thanks to thee, my worthy

friend, for the lessons thou has taught." In the earliest colonial period of New England the blacksmith shop was an important institution in every village and settlement. Its master was a man of brains, of skill and of muscle. His brains and skill and muscle and his patience were often put to a severe test in the contriving, fashioning and forging of the various and new articles of his craft required by the settlers in their new homes and new life. With the increase of population and of wealth in the colonies the demands upon the blacksmith shop increased in quantity and in variety and in importance. Some of the masters of the blacksmith shops became masters of forges with trip hammers and of foundries.

IRON SMELTING WORKS.

Iron for the blacksmith shops was at first brought from England, although the smelting of iron was carried on in Virginia mountains when the "Mayflower" arrived with the first New England colonists. The Indians destroyed the first iron smelting works in Virginia, but other works were established. Obstacles were put in the way of sending iron to New England, and in 1662 the Assembly of the Virginia colony prohibited the export of iron from the colony. The Assembly again prohibited its export in 1682. The first iron smelting furnace in New England was near Lynn, in the year 1644. The ore was taken from the bogs or swamps of Eastern Massachusetts, where, through the silent processes of nature's laboratory, it is still being made night and day, seven days in a week. But it forms very slowly and in very small quantities.

THE FIRST IRON FOUNDRY.

The first iron foundry in New England was built in 1646, and the first iron pot made in New England was made in that foundry in the same year. The iron was from the bog ores of Eastern Massachusetts. The cast iron Hardware of New England began with that iron pot. The first forge shop in America with a trip hammer was built in Raynham, Mass., by James and Henry Leonard in 1652. In 1655 Joseph Jenks obtained a patent for the manufacture of scythes, the blade of sheet steel with iron back. The iron industry of the cape towns of Massachusetts continued to increase for 150 years afterward, and forges and foundries were established as rapidly as the wants of the country required. As early as 1700 foundries and forges were established in other parts of Massachusetts and Connecticut, the iron being obtained from bog ores or from the Salisbury ores in Litchfield County, Conn.

The county of Plymouth, Mass., produced most of the iron used, as it did most of the manufactures of iron goods. The swamps of that county produced more bog ores, and the ores were more cheaply obtained, than elsewhere in New England, conditions that were sufficiently advantageous to secure the business to that locality.

EXPORTING IRON.

I am not aware whether Massachusetts exported any iron before the Revolutionary War, but it was exported to England from Virginia and Maryland. It was the policy of England to confine the trade of the colonies entirely with the mother country and to allow importations of colonial products free of customs duty. On account of the abundance of wood for fuel and the abundance and accessibility of iron ore in Virginia and Maryland colonial iron in blooms and bars was sold in London to such an extent as to alarm the English iron masters. They appealed to Parliament for

a protective customs duty on American iron. After a long and somewhat bitter contest the English iron masters gained the slight concession of four English shillings per ton duty on importations of American iron. Soon afterward the London merchants and manufacturers rallied in an attack on the duty. The law was so modified as to allow American iron to be imported into London free of duty, but its consumption into manufactures was limited in space to London and 10 miles into the interior from London. In the Parliamentary debates upon the question it was urgently insisted that the natural right of the many workers in the manufacture of raw materials into merchandise for consumption and exportation, to obtain their materials at the natural price, ought not to be abridged in Parliament by the passage of a customs law in the sole interest of the comparatively few producers of raw material. Wages in the iron districts as well as elsewhere in the American colonies were nearly twice as high per day as in England. The colonies exported 2000 tons of iron to England in 1740.

PLYMOUTH COUNTY, MASS.

But to proceed with my subject, Plymouth County, having the advantage of cheap iron, naturally took the lead in the manufacture of goods in which iron was a chief or important element. Cannon, cannon balls, hollow ware and other heavy iron articles were confined in their manufacture to the cape towns. Bar iron was made by forging, rolling and slitting.

About 1720 a trip hammer was used in the manufacture of scythes, and soon after axes, adzes and other edge tools were forged with trip hammers. The first regular iron rolling mill in America was built in Middleboro, Mass., in 1750. In the county of Plymouth in the year 1748, 500 muskets were made for the colony of Massachusetts. They were deposited in a fort in Boston harbor for safe keeping, and were carried away by the British at the evacuation of Boston at the beginning of the Revolutionary War.

SHOVELS.

The manufacture of shovels, which had been done only in the country blacksmith shop, became a business about 1750. Captain John Ames of Bridgewater, an intelligent blacksmith, began to make shovels by hand forging in 1776 as a business. The shovels were heavy and clumsy, but his business increased, though slowly. His son, Oliver Ames, increased the business and improved the quality of the shovels. In 1803 he removed the business to North Easton, where the Oliver Ames & Sons Corporation now make an average of fully 5000 shovels per day, and send them all over the world wherever shovels are used.

NAILS AND TACKS.

Wrought nails were made in Eastern Massachusetts in the early colonial time by hand forging, as they were then and are now made in England. They were exported until Alexander Hamilton's tariff bill was adopted. Tacks were also made at a very early time by hand from strips of sheet iron. Reed of Bridgewater, Mass., is said to have been the first inventor of a machine for cutting tacks and nails from cold iron, at about 1785. A son of the first inventor patented a machine in 1807 to cut and head tacks by one operation at a rate of 60,000 a day. Jacob Perkins invented a machine for cutting and heading nails about 1790, which was patented in 1795. It was said that it would make 200,000 nails per day.

In the year 1798 there were in the counties of Plymouth and Bristol 14

blast furnaces, 6 air furnaces, 20 forge shops, 7 rolling and slitting mills, and many trip hammer shops, nail shops and other shops for the manufacture of iron goods, including cut and hammered or forged nails, tacks, wagon nails, &c., shovels, spades, scythes, saws, bells, cannon balls, firearms, iron buttons for clothing, sheet iron for tinning, hoes and other farming tools, edge tools, wire, and card teeth for the card makers.

THE EVOLUTION OF THE BLACKSMITH.

Prior to the Revolutionary War, in many towns in Middle and Western Massachusetts blacksmiths had evolved into small manufactures of iron and steel, articles of wrought iron, Hardware and edge tools. Iron works were established in a few places in Central and Western Massachusetts where iron ore could be found, and there was one on the shore of Long Island Sound, a little east of New Haven, that used the bog ores from the swamps of North Haven.

Various kinds of machinery for making cloth were made in Central Massachusetts in the latter part of the last century, and wood turning was of very early date. Wooden plates and the large wooden bowls which were well filled with bean porridge, or hash, or stew, and then set in the center of the table, around which the colonial family sat on their stools or benches and from which they fed themselves with their wooden spoons, were some of the articles of manufacture.

The colonists required but little Hardware beyond such as the blacksmith and the wood worker could make. Wooden pegs were used instead of nails, coat and hat hooks were only wooden pegs, the door lock was a wooden door button. The way the outside door was locked was to pull in the latch string. Hinges were mainly of wood. The swinging crane in the fire place and the fire irons were made by the blacksmith, who also made the pot hooks and trammels. Wrought iron nails, wagon nails, hob nails and similar articles were made to some extent by family labor, as they were then and are now made in England. The higher grades of Hardware, used by the wealthy, and cutlery were imported from England.

HAND CARDS.

Hand cards for carding wool into rolls, which were afterward spun into yarn by the industrial colonial dames of colony times with their spinning wheels, were made by hand at an early date in various places in Massachusetts and Connecticut. The most prominent manufacturers of the cards were in Cambridge and Leicester. A Quaker gunsmith named Thomas Earl started the business in Leicester in 1776. He was an ingenious mechanic and made improvements in the hand tools and in the machine for making the teeth, and in the machine for pricking the holes in the leathers, which had formerly been done by hand. At first Plymouth County made all the card teeth and afterward furnished the wire. The business was taken hold of by several other men in Leicester and became quite profitable during and after the Revolutionary War, and through the wars of Bonaparte and the War of 1812.

As late as 1825 all the cards made in Leicester had the teeth set by hand—that is, the teeth were set into the leathers by hand. For that purpose each manufacturer had a small factory in which the leathers were prepared and the holes pricked. The teeth were also made there, at first with hand tools and afterward by a machine operated by hand. Then the leathers and the teeth were sent in a sort of peddler's wagon to all the country within 5 or 10 miles, and left with

families to set the teeth into the leathers. That method would now be called "the sweating process." Whole families spent their evenings at the work,

stamping were cut at the United States Mint. It was not until about 1837 that copper and brass sheets and wire were made in Waterbury, or anywhere else in the country, for sale in the market.

THE WHITNEY COTTON GIN.

Eli Whitney, the inventor of the cotton gin, was an educated school teacher, and it was while he was at the South in that employment that he invented the cotton gin. He began the manufacture of them in New Haven, but did not succeed as well as some of the Southern manufacturers who pirated on his patents.

Whitney turned a part of his factory into a gun factory. In 1798 he got a contract to make 10,000 muskets for the United States, which took him eight years to fill.

DOOR LATCHES.

Blake Brothers began the manufacture of mortise door latches in New Haven in 1835. They made the first mortise latches that were made in this country, and were probably called Blake's escutcheon latches. The latch had a stop. To apply the latch it was necessary to bore a 1½-inch hole through the door.

The Blakes also made wrought iron door locks. In 1840 they were making bed and table casters and thumb latches; in 1842 cast iron door buttons, and in 1844 cast butts, which they sold at \$1.31 per pair, no better nor heavier than manufacturers now sell at 16 cents per pair.

Meriden made wrought iron nails in the last century, but its early manufacturing life was mainly in pewter spoons and tinware.

SLEIGH BELLS.

In 1797 two Connecticut young men had finished a term of apprenticeship with a jeweler at Stockbridge, Mass. One was a New Britain young man named James North, and the other was an Easthampton, Conn., young man named Barton. Each went to his hometown and it will never be settled which of the two made the first sleigh bells for the market. Easthampton claims the honor for Barton in 1797.

The father of James North of New Britain was the village blacksmith of New Britain, and he probably did not like the idea of a competitor for village jobs in the person of his own son. The father advised his son James to make something to sell in Boston or New York. James took the advice of his father and went to Hartford and bought a brass head fire dog, a brass head shovel and tongs and three sizes of brass head pokers, all of English make. He brought them to his father's hall of village wisdom and skill—the blacksmith shop—and father and son and wise loungers studied hard and long over the conundrum, how to cast the brass heads or tops hollow. By sawing one of them open they discovered sure indications that the top or heads were cast in two parts and then soldered together. Then a more difficult conundrum presented itself. It was how to make the patterns in two parts. But they

succeeded in learning by the help of a New York jeweler from England.

Young North soon took a partner, and in 1803 North & Shipman began to make round sleigh bells. They cast the bells around a sand core that was supported on the sand that made the holes in the bell. After casting the bells they were tumbled in a barrel to rattle out the sand. But there was no jingling ball inside. They cast the bells with a hole on one side, through which they put the jingling ball after the sand core was rattled out, and then soldered a piece of metal over the hole. It took a long time to learn to cast the bells with the jingle ball inside the sand core, so that when the sand core was rattled out after casting the bell the ball would remain inside. They paid \$25 to a tramp mechanic from New York for the idea.

An iron foundry was necessary in which to cast the iron fire dogs. A blacksmith's forge was the furnace and two blacksmiths' bellows made the blast. The fuel was charcoal. Two workmen made the sand molds and poured the melted iron to the amount of about 300 pounds per day.

HOOKS AND EYES.

In 1805 Alvin North began to make hooks and eyes for ladies' dresses, &c. The eyes were made from wire, cut to the proper length and then bent by pliers in the hand and flattened by a hammer. The hooks were made in the same manner, except that the hook end was bent after flattening. Harness Hardware was added in a small way.

GUTLERY, BUCKLES, ETC.

Up to 1812 very little progress had been made in New Britain, but during the war of 1812 to 1814 several small concerns were started in cutlery, cheap jewelry, buckles and other small articles. The machines used were extremely crude and could hardly be called machinery.

About 1815 Alvin and Henry, North began the manufacture of silver plated wire, and used it for making hooks and rings and cloak clasps for gentlemen's cloaks. Narrow strips were cut from sheets of copper that had been



Samuel A. Bigelow

and the women and children much or all the day.

CARD MAKING MACHINERY.

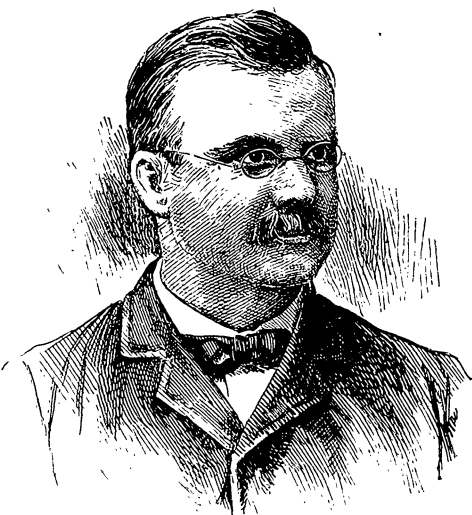
Amos Whittemore, a card manufacturer, of Cambridge, about the year 1790 completed a machine which was supplied with a bow of wire and with leathers as needed. The machine made the tooth from the wire, pricked the holes in the leather and set the teeth into the leather. After the patents and extensions of patents had expired it was improved and adapted to general use. It is now used in the manufacture of the card clothing used in all the factories where carding cotton or wool is done.

That card making machine has had almost as much to do with reducing the cost of clothing as has the Whitney cotton gin. Most of the winter clothing worn in country New England previous to this century was of home made woollen cloth made from wool, carded by hand cards, spun on the home spinning wheel and woven on home hand looms, or of flax or tow cloth. Wool was somewhat scarce, and in 1675 the Massachusetts colonial legislators put an export duty on wool and live sheep. Massachusetts politics have changed since 1675. We have too much wool now and we put an import duty on wool and live sheep.

LACK OF RAW MATERIAL.

On account of the want of raw material near at hand probably, the other States of New England were later than Massachusetts in the manufacture of Hardware.

Wooden clocks were made in Waterbury in 1790. Metal buttons were made there about that time by casting them solid in molds, casting in the wire eye. About 1800 they were made from sheet metal struck up in dies. The metal ingots properly alloyed were sent from Waterbury to an iron rolling mill in the northwestern part of Connecticut near the Salisbury iron mines, and were rolled into sheets. The sheets were returned to Waterbury and were slit into narrow strips by small rolls operated by horse-power. The dies for

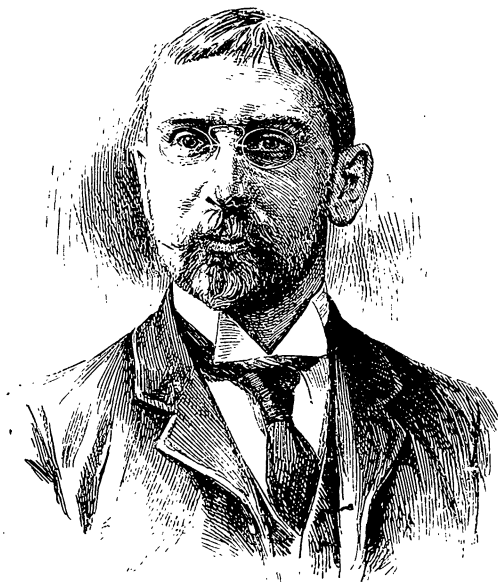


Edwin L. Haley

hand plated. The strips were then drawn through dies by horse-power into solid tubing shape, which answered the purpose of wire.

In 1829 a small foundry was started

in New Britain with a little cupola furnace. The blast was furnished by two blacksmiths' bellows operated by horse-power. The lowest price for castings was 8 cents per pound.



Isaac H. Smith

The first steam engine in New Britain was in 1831, and anthracite coal was first used there that year.

NEW BRITAIN'S DEVELOPMENT.

In 1837 there were 48 little concerns manufacturing Hardware, &c., in New Britain, but only one of them could have paid its debts if called upon. The panic of 1837 was felt there severely, but most of the failures were not till 1840, two or three years after the beginning of the panic.

A great variety of small Hardware and kindred articles were made about this time in New Britain, but consolidation began, the little concerns were absorbed or wiped out, and the business is now in the hands of fewer but mostly large concerns.

SPOONS.

Spoons were first made from sheet metal in Meriden in 1820. The press that cut the blanks out of the sheet metal was run by man-power and steadied by a heavy balance wheel. The first German silver made in Meriden was in 1836. The Meriden Cutlery Company's business was started in 1834 in a very small way, and the John Russell Cutlery Company was started about the same time.

COFFEE MILLS AND CASTERS.

Charles Parker made his first coffee mills in Meriden in 1832, and soon made spoons, saw rods and vises, employing six hands. Foster, Merriam & Co. made casters in 1835, with 14 hands, and soon ran up their annual sales to \$8000. Screw making in the United States by machinery began in Providence in 1834.

BARTER.

In the early years of the manufacture of Hardware in this country the people were too poor to have specie on hand and the paper currency was of doubtful value. Most of the trading was by barter. Labor was paid in barter or in orders on country stores. Boston merchants had no money to buy Hardware with, but they bought it payable in goods out of their own stores or in orders on other merchants

in groceries, dry goods, drugs, pottery, salt, codfish and mackerel, rum and molasses. The manufacturer sold his goods and carried back his barter pay, which he distributed to pay his debts and his workmen. Many of the more prosperous manufacturers kept a little country store with a very limited variety of articles for clothing and food and drink.

Up to 1827 a drink of rum today was regularly given to each employee at 11 o'clock and 4 o'clock by carrying it in a pail through the shop. The employees were almost entirely American born and many were hard drinkers.

CHANGED CONDITIONS.

Much of the work of small Hardware was done in the homes of the poor, as was the method in all Europe and still is in some parts. The workers were free from factory rules and personal superintendence. Their hours of work were very irregular, and their habits often more so.

Household manufacturing that was so inefficient, so costly to the employer and so often degrading to the worker and family, is a method of the past in this country. The little shop, its concomitant, is gone with it. And so has barter trade, the long delayed settlements with the workers, and the extortions of the factory store or the order store. We now have great factories, well lighted and airy, with all the modern conveniences, filled with wonderful machinery and skilled workers, turning out prodigious quantities of merchandise at a quarter of the former cost of labor; and labor gets double the old pay for shorter hours, and gets it in cash once a week. Labor has given up the personal and unthrifty independence of the sweatingsystem of household labor, but has gained the independence of a higher condition of manhood.

E. Benjamin Andrews, LL.D., president of Brown University, was next introduced and after some pleasant introductory remarks, which were fully appreciated by the guests, he proceeded to the discussion of the subject assigned to him—

The Causes of the Business Depression.

The first part of President Andrews' address was devoted to an argument showing that the disturbed condition of business is not owing either to the Sherman act or to tariff agitation, though both of these causes were referred to as perhaps contributing something to the depression. The speaker then continued, referring to the demonetization of silver as being the potent cause of the depression:

I believe that the true cause of our financial distress is to be found in the scarcity of full money, leading to a continuous and discouraging fall in

general prices, which first made production less and less profitable and now at last makes it less and less possible.

Our present malady is only an accentuation of one through which the gold using world has been passing ever since 1873. That was the year when Germany and the United States demonetized silver, an act which, with the similar acts to which it led other nations, caused a shrinkage of somewhere near one-half in the supply of fundamental money possessed by Europe and North America.

I do not accept unmodified the quantity theory of money, so called, that the value of each unit of money varies inversely as the total quantity of money, but I say that unless economic analysis is vain, the relative scarcity in full money produced by the extrusion of silver from that office must have added greatly to the value per unit of the full money which remained.

The demand continuing the same or increasing, you cannot cut down the supply of any material one-half without enhancing the value of that material per unit. And this is just what has occurred since 1873, an increase of at least 30 per cent. in the value or general purchasing power of a grain of gold.

Now, the other face of the phenomenon called a rise in the value of money is the fall of general prices. That the value of money goes up means simply that the prices (values in money) of things in general go down.

Rising money value, falling prices—these are simply the two sides of one and the same inseparable fact.

That the prices of most things have been falling since 1873 is uncontested, but the baneful effect of such fall is not so widely recognized.

Let me beg you to remember that it is falling prices which cause harm, not falling costs, which are always advantageous. Costs were falling before 1873 much faster than now, but prices were then rising. Also, it is the fall in prices that is mischievous and not the lowness of the prices after they have fallen.

A low range of prices, considered apart from all the causes which made it low, is just as good as a high range.



Charles H. Brock

But a general fall of prices is always a curse.

In business and trade the time at which you sell each piece of the capital

you handle is later than the time when you buy it. During that interval, as a rule, your capital has lost in price. To make a given piece fetch what it cost you, you must have put some labor into it. To make it fetch more you must put more labor into it than would have been necessary had prices been steady or rising.

You may put into a piece of capital a good deal of labor, yet never get back what the raw material cost you. Every way production at such times is extra hazardous, and men more and more withdraw from it unless they have to insure them some special "pull" upon society through a tariff or a trust.

It is, in fact, the fall in prices since 1873 that makes these years the great period of high tariffs and of trusts all over the gold using world.

On the other hand, the increasing value of money, which always goes with falling prices, for it is the same thing otherwise named, tempts holders of money and of titles certain to be paid in money to cling to these and not invest in productive capital.

They will loan on absolute security, if they can get such, and in this case will accept a very low rate of interest; but sooner than launch into business, alienating their money for property and capital other than money, they will cling to their gold.

We thus see everywhere to-day immense and needless reserves in banks because industry is extra hazardous, and because money, even if not loaned at all, is daily swelling in value.

The president of the Hardware Club of New York, William H. Williams, was next introduced as

A Friend from Gotham,

and after the cordial greeting which was accorded him spoke as follows:

No one in this vicinity needs to be reminded of a saying current 100 years ago that New England led the colonies, Massachusetts led New England, Boston led Massachusetts, and Sam Adams led Boston. The political cynic of that day hoped the time would come when the Adamses would be suppressed, but history has, proven that they are a hardy and irrepressible race, and your genial and accomplished toastmaster is no exception to the rule. He says he is willing that I should tell you about the unique and unceremonious manner in which our acquaintance began, but I fear that, in the presence of his spiritual adviser, it might be somewhat embarrassing to him. I will say, however, that we met in the dark in a Brooklyn boarding house, and, after indulging in a few remarks by way of soliloquy, I said to him "It's all right, old man; you pray and I swear, and neither of us mean anything—let's be friends," and we have been friends for nearly 30 years. I suppose it is in part due to that friendship that I have the pleasure of being here to-night. Whatever the cause, I am glad to meet you one and all. I am glad to meet the Governor of this great Commonwealth. It's always a pleasure to meet, a brave man and a patriot, and I'm never averse to meeting, on any occasion and under all circumstances, a Republican, for he is generally brave and always patriotic. It is a great pleasure also to meet the other distinguished guests who grace your board, as well as the gentlemen whom I have been privileged to know in business life, and those with whom I have had business relations which have been profitable to me, and I hope not wholly void of pleasure to them, but whom, till now, I have not personally known. I like to think that, as we grow old together, our occasional meetings have in them more and more the elements

of friendly regard for each other, rather than the purely selfish and mercenary characteristics of business.

I can in truth say that it was always a happiness to me to come to Boston. On my way over yesterday I met a friend to whom I remarked that I was on my way to Boston, for a second time within a month, to attend a meeting of Hardwaremen. He said it reminded him of a story told of the late Mr. Travers of New York, who on one occasion met an old college friend on Wall street whom he had not seen in a long time and of whom he inquired where he had been and what he'd been doing. The friend said he'd been lecturing.

"W-what?" said Travers. "Y-you lecturing. W-where on earth did you lecture?"

"Oh!" said the friend, "I lectured in Chicago and in Boston. Lectured twice in Boston."

"T-twice in Boston?" said Travers.

"Yes," said his friend, "I lectured twice in Boston."

"G-glad of it," said Travers. "I h-hate Boston."

But I don't. On the contrary, I like Boston. I like to visit your capitol and to look at the battle-scarred flags which tell mutely, but more eloquently than even the cultured phrase of your most gifted orators, or writers, or poets can tell, the thrilling story of Massachusetts' valor and Massachusetts' loyalty and devotion to the Union. I like to go to your grand old Common and read, as I often do, the inscription on the soldiers' monument, erected by a grateful city, which is an inspiration of patriotism and which should be in every school book from the Atlantic to the Pacific, and from the Lakes to the Gulf. I like to pay my respects—and I do it reverently—to the old State House, the old South, and Faneuil Hall, whose very stones are yet instinct with the spirit of Otis and Warren, of Adams and Hancock, of Phillips and of Sumner. Even your bovine paths have no terrors for me. Although I don't like to say it when in the City of Brotherly Love, I'm inclined to sympathize with the Boston young lady whose Philadelphia friend criticised your crooked streets, and asked why Boston was not properly laid out. "Never mind, my dear," said Miss Beacon Hill, "when Boston is as dead as Philadelphia, we'll see that she is properly laid out." Oh, yes, I like Boston, and I like all New England. Pride, in many of its phases, is an unamiable quality and should not be vaunted: but I'm not ashamed to confess to a pride in the fact that seven generations of my ancestors repose beneath the soil of New England. I have a little home in Connecticut, where my children go to get God's pure air in summer. It is only a plain old fashioned house, standing on a half acre, but amid trees that waved their branches in salutation and God speed to Israel Putnam and his farmer soldiers; and I love it. Tammany taxes do not vex me there. Several hundred of my neighbors are very dead—for my little place adjoins the inclosure where the "rude forefathers of the hamlet sleep"—but the living ones are kind and noble, and all the traditions of the place appeal to our better instincts and beckon us to better life; and no baron in his castle on the Rhine, no squire in his ancestral English home, no wealthy compatriot looking from his broad veranda upon your beautiful harbor, or upon the majestic Hudson, is happier than I am when I can leave behind me the noise and turmoil of town and indulge, if only for a few hours, in the simple comforts and pleasures of my little Woodstock home. But I have been introduced as a "Gothamite," and were it at the peril of life or even of your gracious favor,

I will say that as much as I like Boston, greatly as I respect your imperial Commonwealth, I like New York and the great Empire State better. They have a place in my affections and in my pride, secure even against the seductions of your charming hospitality. Of them I am glad to say that if the world does not know their history, the world feels, acknowledges and respects their influence. Even in this presence, I may be pardoned a pride that I am a native and a resident of a State that is the chief one in the Union in wealth and population, in commerce and in manufactures, while she is behind none of her sisters in refinement, in toleration and in learning, in liberal arts, in literature and in philanthropy. Her great metropolis is the clearing house of the Western continent. Within her borders the nerve lines of the great railroad interests of the Western world converge and radiate. In indomitable patriotism, as well as in her cosmopolitan characteristics, she acknowledges no superior. More than one-sixth of all the internal taxes are raised from New York. More than one-tenth of the people of the Union live in New York, and nine-tenths of the remainder, outside of Boston, wish they did. More than three-fourths of the commerce of the nation with the world is entered at the port of New York. Not only in this land, but across the seas and around the world, New York is the recognized leader in human rights and in human progress.

But you will think I have mistaken the countersign referred to in my toast. Forgive me if the love of a loyal son has betrayed me into untimely praise of a city and State of which, I am sure, you are hardly less proud than I am. Not knowing what your committee had in mind, I will assume the countersign to be the fraternal relations which are traditional between New York and Boston Hardwaremen, and in behalf of the organization which I have the honor to represent, I beg to assure you of the continued good will and friendship of your *confrères* in New York.

I wish I could bring you tidings of good cheer in respect to the business outlook. But of one thing we may feel sure, the activities of 65,000,000 of people, with all their multifarious interests and industries, will not long remain quiescent. Panics may come, and with them Democratic Congresses, but the people will triumph in the end even over such obstacles to their prosperity. No one present, unless it may possibly be the gentlemen of the press, doubts that were the affairs of the nation entrusted to the men of our own guild, we should soon be extricated from all the difficulties pertaining to the public finances, internal taxation, and affairs of state which now beset us. Surely if the Ways and Means Committees of our National Legislature were composed of Hardwaremen the world would be spared the humiliating spectacle of a tariff bill which scheduled hydraulic rams as live stock, and garden hose and hand-cuffs as wearing apparel.

You are to be congratulated, gentlemen, on the success which has marked the first year of your organization and on the auspicious beginning of what, I trust, may be a long succession of annual dinners. The most interesting and instructing address of New Haven's young but vigorous Mayor, emphasizes the fact that as in most other things, so in Hardware, the whole country is indebted to New England as the pioneer and instructor in this great industry. You, gentlemen, are the worthy successors of a long line of honorable and successful merchants and manufacturers, and it is a valued honor as well as a great

Samuel A. Bigelow Frederic T. Greenhaff W. H. Bolles.
 Chas. H. Bolles Chas. H. Bolles W. H. Bolles
 James A. Munroe E. H. Mansfield John H. Robbins
 Fred. H. Butts. Samuel Weston C. E. Curran Albert M. Miley
 C. D. Ewer J. M. Brown Frank Walker
 Wm. J. Donovan W. C. Henshaw J. D. Hunter A. S. Young
 Joseph K. Mipple Dalton Tallin Henry Brooks.
 Hobart Ames James N. Foy Allan J. Chase
 Baynard C. Dodge Chas. J. Albridge Juney
 Chas. E. Adams. Chas. J. Albridge Juney
 L. S. Peace E. R. Gaudinon Wm. H. Williams.
 Charles C. Adams. Francis E. Parker Frank M. Smith
 W. B. Sargent J. T. Martin. W. B. Thomas. Henry A. Winship
 Edwin L. Haley James Murray James A. Cook
 Hiram L. Janovic Josiah E. Bacon Geo. Mulhall
 C. H. Walker James A. Haley E. J. Neale Chas. H. B. Bock
 D. Arthur Brown E. Loring Richards Richard. Whitcott.
 Sydney H. Plumb Henry C. Cawway T. H. Baldwin
 John A. Congdon William M. Irving
 Luther Adams Chas. H. Taylor R. K. Adams Arthur C. Carney
 H. A. Stratton E. L. Sargent Charles F. Driscoll
 Leon C. Carter. J. H. Wales Oakes A. Ames
 W. H. Bolles. Fred. K. Walker Joseph Williams
 Richard H. Bolles Chas. H. Bock. John T. Chase
 Chas. E. Shumcke J. G. Brown S. Lawrence Bigelow.

Guests at the Boston Dinner.

pleasure to be permitted to sit at your hospitable board.

We regret that the pressure on our space compels us to refer in a cursory manner to the speeches which followed. Interesting and eloquent addresses were made by Curtis Guild, Jr., and Rev. William H. Bolster, the former emphasizing the importance of the activity of business men in political matters and the latter discussing the subject "Strength vs. Keeness." From Mr. Bolster's remarks we make the following extract:

I cannot help thinking, after all, that my work and yours, as gentlemen engaged in the Hardware trade, has some analogies. We are all of us trying to supply the needs of men. The needs of the human race are God-created needs and, while it is my business, according to the measure of my ability, to meet the moral and the spiritual needs of those who are placed in my charge, I have never yet seen any reason to believe that the physical needs of men were not just as real and



Charles B. Adams.

just as God-created as the spiritual needs of men. Therefore, all trade looked at in this way is a kind of ministry to meet the necessities of men, and into every honorable business, and certainly your business is an honorable business, may go the highest moral qualities, for we are all alike engaged in ministering to the necessities of men, and so, in our work, there may be the spirit of service.

In the absence of Henry A. Thomas, who was expected to speak on "The Civil Service as a Career," the toastmaster called upon

Fayette R. Plumb

of Philadelphia, who made the following graceful and appropriate response:

I suppose it is in order for me to return thanks to the chair for thus recognizing me; but, occupying the position of private in the ranks and feeling perfectly secure from any demands of the chair, I have naturally enjoyed the evening to the fullest extent. I am, therefore, not in a proper state of mind to give you my best thoughts. I wish to say, however, that it was a source of great pleasure for me to learn that Boston had followed in the footsteps of Philadelphia and New York by forming a Hardware association. I give Philadelphia the prece-

dence over New York in my remarks because she was the first of her sister cities to conceive the idea of bringing her competitors into closer relations and doing away with the thought, which was gradually gaining ground in our midst, that those opposed in trade must necessarily be enemies. I am happy to state that this feeling has been entirely obliterated and the business interests greatly benefited in consequence. Looking about me tonight at this hospitable board, with these beautiful viands spread before us, and with the intelligent faces of representative men of New England gathered about it, I am convinced that this is the dawn of a new era in the Hardware trade of Boston, and your companions in the loyal city of Philadelphia extend a hearty greeting and best wishes for your success.

In introducing R. R. Williams, Hardware editor of *The Iron Age*, Mr. Adams referred to the active interest taken by *The Iron Age* in the establishment and carrying on of Hardware associations, and congratulated the guests that a report of the dinner might perhaps be looked for in the next week's issue, which would thus make known all through this country from the Atlantic to the Pacific what the New England Iron and Hardware Association has done. After the address of Mr. Williams on "The Joys of an Editor," Toastmaster Adams, in behalf of the committee and the officers of the association, extended thanks to all present for their indorsement of the first annual dinner of the New England Iron and Hardware Association, and expressed the hope that all might live and prosper and be present at a similar gathering another year. He closed with the sentiment with which the toast list concludes:

To all and each a fair good night,
And pleasing dreams and slumbers light.

The guests then separated with mutual congratulations on the success of the banquet, and expressions of confidence that the work of the association in bringing together those identified with the interests represented could not fail to be of lasting benefit.

New England Iron and Hardware Association.

This association, under whose auspices the dinner was given, is composed of New England wholesale houses dealing in Iron, Steel, Hardware and kindred lines. Its officers, whose portraits are given herewith, and its constitution, are as follows:

President,
S. A. BIGELOW
of Bigelow & Dowse Company.

Vice-President,
E. L. HALEY
of Dodge, Haley & Co.

Secretary,
F. H. BUTTS
of Butts & Ordway.

Treasurer,
C. H. BRECK
of Jos. Breck & Sons.

Directors:
S. A. BIGELOW, A. J. CHASE,
E. L. HALEY, LEON C. CARTER,
F. H. BUTTS, J. H. ROBBINS,
C. H. BRECK, E. F. MANSFIELD.

CONSTITUTION.

ARTICLE I.

This association shall be known as the New England Iron and Hardware Association.

ARTICLE II.

The objects of this club are social intercourse and the discussion of all matters of interest relating to the various branches of trade represented in its membership.

ARTICLE III.

The membership shall consist of wholesale houses dealing in Iron, Steel, Hardware, and kindred lines, doing business and carrying a stock in New England, each house to be entitled to one vote only.

BY-LAWS.

ARTICLE I.

The officers shall consist of a president, vice-president, secretary, treasurer and four directors, who shall constitute the Executive Committee, three of whom shall be a quorum.

The officers shall be elected annually by ballot by a majority vote at the June meeting, and shall hold their offices till their successors are chosen. Ten members shall constitute a quorum. Vacancies in any office may be filled at any regular meeting of the club, members to be notified that such action is to be taken.

ARTICLE II.

The president, or in his absence the vice-president, shall preside at all meetings of the club. In the absence of the president and the vice-president the club shall elect a president *pro tem*.

ARTICLE III.

The secretary shall attend all meetings of the club and Executive Committee; conduct all correspondence, keeping full records of same; notify committees of their appointments, new members of their election, and members of all meetings, giving at least a week's notice. He shall collect all moneys due to the club, pay same to the treasurer and take his receipt therefor. The sum of \$50 shall be paid him annually from the treasury to defray expenses of clerical labor. It shall be the duty of each member to notify the secretary of his intention to be present at any meeting of the club.

ARTICLE IV.

The treasurer shall receive and keep an account of all assessments or other moneys received by him, pay all bills when certified as correct by the secretary and approved by either the president or the vice-president of the club and make an annual report, and also report at such other times as the Executive Committee may require.

ARTICLE V.

The Executive Committee shall provide for the regular meetings of the club, call special meetings whenever in their judgment the interests of the club demand it, or when requested to do so by three members of the club in writing, and attend to any business not requiring special vote of the club. They may invite to the annual dinner as guests of the club gentlemen whom in their judgment it would be the pleasure and interest of the club to entertain and the expense of such entertainment shall be defrayed from the funds of the club.

ARTICLE VI.

Any house eligible to membership, if recommended by the Executive Committee, may be elected at any regular

meeting of the club by a majority vote and become a member by signing the by-laws and paying the annual assessment of \$25.

ARTICLE VII.

The regular meeting of the club shall be held on the second Tuesday of each month, at 1 o'clock p. m., at which meeting the representatives of the houses in the membership of the club shall dine together, the price for such dinners not to exceed \$2 on all ordinary occasions, and to be paid from the treasury of the club. Partners or officers of a house having membership other than its regular representative may attend the regular meeting, and may dine with the club by paying the treasurer for each additional dinner.

ARTICLE VIII.

No religious, political, or personal questions shall be discussed at any meeting.

ARTICLE IX.

Any member failing to pay sums due from it to the club after reasonable notice within three months after such sums are due, or who shall fail to be represented at four successive regular meetings of the club without giving satisfactory excuse, may be dropped from the roll of membership by vote of a majority of the members present at any regular meeting.

ARTICLE X.

These by-laws may be amended or revised at any regular meeting of the club by a two-thirds vote of the members present; but no such amendment shall be considered unless the same has been submitted in a printed or written notice to all the members previous to the meeting when it is to be acted upon.

Request for Price-Lists.

THE STOCK AND FIXTURES of Haney, White & Co., 2730 to 2734 North Broad street, Philadelphia, dealers in Hardware, paints and mill work, were entirely destroyed by fire on the night of the 14th inst. They advise us that they would be pleased to receive from the trade copies of catalogues, price-lists, circulars, &c., relating to their line of business.

Bicycle Notes.

E. C. STEARNS, & Co., Syracuse, N. Y., issue an artistic Bicycle catalogue printed on a fine grade of paper, and embellished with illustrations of riders, interior views of their workshops, &c. The cover is handsomely printed in colors on a tinted background. Their line of wheels are shown, including Stearns' Special, Model A, Model B, Stearns' racer, the Yellow Fellow, weighing 16 pounds, Model C, ladies' wheel, and Stearns' tandem. Illustrations are also given of the Providence double tube pneumatic tire; the manner in which the head and front fork are constructed; also of the chain adjustment, ball bearings, crank hanger, adjustable handle bar, wood rims, saddle and seat post, spokes, &c.

SIMMONS HARDWARE COMPANY, St. Louis, Mo., issue a catalogue of their 1894 Bicycles, including the Lyndhurst, Eagle, Altair, Essex, Alcyon, Westminster and Western. The catalogue also illustrates Bicycle Sundries, Velocipedes and Tricycles. The cover is printed in gold and blue, and reproduces a photograph of the start in a Bicycle race.

THE NEW YORK BELTING & PACKING COMPANY, 15 Park Row, New York,

issue a pamphlet relating to their New York Key Tire, their Gee-Whiz Tire on special wood rim, the Whippet Improved Tire, Cork Handles, Rubber Pedal Rubbers, &c. Illustrations show these articles and descriptions call attention to their construction and advantages.

R. Christensen.

R. CHRISTENSEN, who for a number of years has wholesaled Cabinet and Upholsterers' Hardware at 90 Chambers street, has leased the entire street floor, basement and sub-basement at 88, adjoining, which for a long time were occupied by A. Field & Co., Tack manufacturers. These floors have a frontage of 25 feet and are 73 feet deep. There are two elevators and steam heat, and the premises are well lighted and ventilated. He contemplates modernizing the front by having a large plate glass show window put in. Mr. Christensen was for years connected with the old Cabinet Hardware house of A. Hammacher & Co. as buyer. Such portion of the space as he will not require will be sublet to suitable tenants, with immediate possession if necessary.

United States Net & Twine Company.

United States Net & Twine Company, now at 219 Fulton street, New York, on or about April 1 will occupy the premises at 316 Broadway, between Duane and Pearl streets. They have leased the street floor and two basements, each 25 x 150 feet, on Broadway, with an opening on to Pearl street 50 x 100 feet. The floors are being renovated, decorated and remodeled. The company's entire business, wholesale and retail, will be done at this address. The retail department will make a specialty of fine grades of Fishing Tackle, hand made by experts in their own factories, for clubs and gentlemen sportsmen. Their factories are located at Whitestone, Long Island City and Brooklyn, L. I.; Pawtucket, Conn.; Lawrence, Mass.; New York City and Central Valley, N. Y. They are arranging a wholesale sample room, which we are informed will be especially fine. The company have bought the ownership of the Cosmic Rod, plant and factory at Central Valley, N. Y., from A. G. Spalding & Co. Among the goods made by this concern are Fishing Tackle, Rods, Reels, Braided, Enameled and Silk Lines, Fish Nettings, Twines, Tennis Nets, Seines, Purse Nets and fishermen's supplies. They are also agents in the United States for the goods of Samuel Allcock & Co., Redditch, England.

Hammacher & Delius.

HAMMACHER & DELIUS, exporters, are now established in their new quarters at 141 West Broadway, New York, having recently moved from 123-125 of the same street. They have leased the first and second floors and basement, each 120 x 32 feet, in a handsome new building just completed. On the first floor they receive and handle all goods which come into the building, shipping abroad as orders are completed.

On the second floor the offices occupy about one-half of the front portion. The remaining space is used as a packing room. Packages received below are sent to this department. Instead of laying goods out on the floor, large strong bins, each 3 x 2½ x 2 feet, have been built around the sides in tiers numbered from 1 up, there being 84 in all, besides space on top. Invoices, when received, have the number of one

or more of these bins noted on them, so that all or any part of it will go directly into the bin designated. This avoids confusion and facilitates the assembling of orders, besides keeping goods fresh and away from injury and dirt.

The cellar is reserved for storing full case stock. A small dumb waiter carries light articles, order books, mail, &c., between the floors, while passengers and freight are taken up and down on a combination electric elevator. The whole place is admirably lighted, both naturally and artificially.

Hammacher & Delius have their own house in Hamburg, Germany, and do a large European and South American business, besides trading with many other portions of the globe. Of course large orders and carload lots go through direct. Only orders which must be manipulated in New York are handled here.

Screen Wire Cloth Holder.

SICKELS, SWEET & LYON, 35 Barclay street, New York, are selling Hardware Charlie's Screen Wire Cloth holder, an illustrated description of which was given some time ago in *The Iron Age*. The holder carries seven rolls of Wire Cloth: 24, 26, 28, 30, 32, 34 and 36 inches wide; the rollers being pushed through the center opening in the roll, not requiring the Cloth to be rerolled in putting it on the rollers. The Cloth is kept in solid roll shape by a wrought iron tension rod in front of each roll. The holder is made in a durable manner, nicely finished, and the point is made that its use increases the sale of Wire Cloth by the attractive manner in which it displays the Cloth. The price of the Holder is \$5.

The Typewriter and Business Correspondence.

BY "AN OLD FASHIONED MERCHANT."

WITH THE COMING of the stenographer and typewriter into every office long winded letters are the rule, and most of these are folded into wads while wet from the copying book, reaching their destination in a crumpled, untidy condition. When we took boys into our offices, in the old days, we taught them how a letter or invoice should be folded before being put into an envelope. It was an important point in business etiquette that the paper should be folded with regard to the envelope, to nearly fit that in width and length, yet not wrinkle or be difficult to inclose or withdraw, and have just as few folds as were absolutely necessary. Nowadays the letter is folded as if it was a paper wad and shot into the envelope. I think a great many men have no idea of the slovenly appearance their letters make when they are opened because of this helter skelter manner of folding them.

Then, as to typewritten letters. How extremely difficult it seems to be to get the average man to stop when he is dictating to a stenographer. Were he writing the letter, when he had said his say he would be only too glad to add, "Yours truly," and stop. But with the stenographer to take down as fast as he can spin it off, after he has given a full answer, he wonders if he couldn't add another sentence. He does; then

another and another, till he is sure that this will make a good, long letter, and he finally consents to stop. Most of us have learned that the first two sentences or so of these elaborate, "dictated by" letters contain all of the information and that the rest is but amplification and verbiage; hence we stop right there and are sorry that our correspondents could not have had the wisdom to do the same thing.

Trade Items.

READING HARDWARE COMPANY have removed their New York headquarters from 81 to 96 and 98 Reade street, occupying the first floor and two basements. The premises are being elegantly fitted up and will be especially commodious and attractive.

JOHN H. GRAHAM & Co., 95 Reade street, New York, have taken the general agency for Charles Buck's Standard Buck Tools, and will carry a large and complete stock of these goods. A line of Chisels, Gouges and other Edge Tools arranged in a large black walnut upright showcase will be on permanent exhibition at John H. Graham & Co.'s store.

DURING the past five years Anthony & Cushman Tack Company, Taunton, Mass., have not been making Tacks and Nails, their factory having been in operation devoted to other lines. They advise us that they are now, however, about to resume the manufacture of their former goods, and are getting their 75 Tack and Nail machines ready to start. They propose to remain outside the combination.

C. E. HUDSON & Co., Leominster, Mass., who manufacture Hudson's Garden Hose Mender, are sending out an attractive advertising novelty in the form of a cardboard butterfly, which is balanced so as to poise on the tip of the finger and have the appearance of flying. This will be sent to the trade upon request without charge.

H. L. JUDD & Co., 87-89 Chambers street, New York, have recently rearranged their several large show windows facing Chambers street, making a handsome display. Wood frame work similar to a staircase has been covered with black velvet, and a great variety of goods tastefully arranged on it. Some of the more prominent articles are table, piano and banquet Lamps in various styles and finishes, together with appropriate silk shades for them, Candelabra, Thermometers, beveled plate Mirrors in metal frames for boudoirs, fine Stationers' Hardware, Inkstands, &c., silvered Tea Bells and art goods of different kinds both useful and ornamental. One window is reserved especially for metal Upholstery Hardware.

J. GLENNON & Co., 2622 Shields avenue, Chicago, manufacturers of the Lawn Mower's Partner, or Grass Carrier, refer to testimonials which they have received from the judge of awards on Lawn Mowers and the chief of the horticultural department at the late World's Fair. These officials pay a high tribute to the efficient work done by this device. The Lawn Mower's Partner is adjustable to all sizes and makes of Mowers.

THE TRADE will observe on the outside cover the announcement of Wilmot & Hobbs Mfg. Company, Bridgeport, Conn., and 20 Murray street, New York, in which they give a list of prominent jobbing houses carrying a large stock of their well known Coprized Oilers. It will be observed that

these goods are handled by leading concerns in all parts of this country and Canada.

R. H. DANA, exporter, formerly of the R. H. Dana Company, 15 Whitehall street, New York, contemplates starting for the colonies of South Africa and Australia the middle of April on a business trip. Orders taken by him for American Hardware, &c., we are informed, will be executed by Biddle Purchasing Company, 168 Church street.

O. C. SAWYER, Sharon, Vt., having purchased the machinery and right to manufacture the Varnum Patent Ox Bow Pin from the late H. C. Varnum estate, is now putting this article on the market. Mr. Sawyer announces that, with improved machinery and better facilities for manufacturing, he has reduced the price of the Pins.

COATES CLIPPER MFG. COMPANY, Worcester, Mass., have made arrangements with Alfred Field & Co., 93 Chambers street, New York, to act as selling agents for their Coates' Patent Horse and Barbers' Hair Clippers, hand and power.

IT WILL BE OBSERVED that among our Special Notices this week announcement is made of a large sale of Cutlery and kindred goods on Thursday and Friday, March 29 and 30, by E. Bissell, Son & Co. Goods will be sold in quantities to suit the jobbing and retail trade and without reserve. Catalogues will be sent to those desiring them as soon as ready.

THE COPARTNERSHIP formerly existing between James W. Gifford and E. B. Richards, under the firm name of Jas. W. Gifford & Co., Attleboro, Mass., has been dissolved by mutual consent. The Hardware business of Jas. W. Gifford & Co. has been purchased by a corporation known as the Jas. W. Gifford Company, who have been incorporated under the laws of Massachusetts, and they will continue it at the old location.

THE HARDWARE AND Coal business heretofore conducted by Solomon H. Parks and William E. Mosher, under the firm name of Parks & Mosher, Sandy Hill, N. Y., has been dissolved. William E. Mosher will hereafter carry on the Hardware portion of the business under his own name, Mr. Parks devoting his attention exclusively to the Coal business.

THE FIRM of Wright Bros. Hardware Company, Doniphan, Mo., have been incorporated, with a capital stock of \$10,000. They will succeed the firm of J. R. Wright and will do a general Hardware business.

THE ANNUAL MEETING of the Hardware Club of this city was held on Saturday, March 17, in the parlors of the Cosmopolitan Hotel. An adjournment, was, however, taken to meet again at an early date in the rooms of the club in the Postal Telegraph Building.

THE HARDWARE FIRMS of Whitwam & Swanson and Ferres & Co., Hamilton, Ont., have been consolidated, and will in the future trade under the name of the Hamilton Hardware Company, Limited. James Ferres is president of the company, C. A. Whitwam vice-president and manager and W. J. Swanson secretary.

EDWARD F. BARROWS, who for the past four years has been the general manager and selling agent of the Barrows Lock Company, and who for six years previously held a similar position with the F. C. Linde Mfg. Company, has resigned and severed his connection with the former company and has entered the field as a Hardware broker with headquarters at Lockport, Ill.

In a circular relating to the matter Mr. Barrows states that he will make a speciality of negotiating the sale of Hardware of any kind and quality, and in any quantity, either by solicitation to the trade or by auction sales, in Chicago or St. Louis. Mr. Barrows will be glad to hear from any dealer having overstock of any goods or having a quantity of goods for which there is no demand. He is also desirous of receiving copies of catalogues, circulars, &c., from the trade.

THE HARDWARE FIRM of Braunsdorf & Gerstner, composed of William Braunsdorf and Anton W. Gerstner, 634 Eighth avenue, New York, has been dissolved by mutual agreement through the retirement of Mr. Braunsdorf. Mr. Gerstner has assumed the payment of all outstanding liabilities and all bills will be paid by him. Mr. Gerstner will continue the business at the same address.

Price-Lists, Circulars, &c.

CINCINNATI CORRUGATING COMPANY, Piqua, Ohio: The Life of an Iron Roof. The company issue this instructive pamphlet upon a subject of interest to those intending to build. The book will be sent free by the manufacturers upon application.

BERGER BROTHERS, 237 Arch street, Philadelphia: Tinners' Hardware and Roofers' Supplies. An illustrated catalogue and price-list for 1894 of 96 pages shows a large line of these goods. Accompanying it is a revised discount sheet, also a circular showing different views of a residence equipped with their Eave Gutter Hangers, and other cuts showing the old and new way of forming gutters.

THE KNAPP & COWLES MFG. COMPANY, Bridgeport, Conn.: Hardware and House Furnishing Goods. An illustrated catalogue and price-list shows Screw Drivers, Bits, Cold Chisels, Pocket Wrenches, Combination Haft, Washer Cutters, Tack Claws and Hammers, Carpet Stretchers, Hack Saw Frames, Garden Tools, Pruning Shears, Box Hooks, Scrapers, Ice Picks, Shoe Stretcher, Nut Cracks, Mincing Knives, Spring Hinges, Tire Bender and Upsetter, Rubber Bumpers, Tool Handles, &c. A discount sheet accompanies the catalogue. Attention is called to extension and solid back Hack Saw Frames, Shoe Stretchers, Tire Bender and Upsetter and other small articles as being new goods recently added to their line.

THE CHARLES PARKER COMPANY, Meriden, Conn., and 97 Chambers street, New York: Parker's Patent Vises. An illustrated catalogue shows Vises, also Ratchet and Geared Drills, adapted to locomotive works, car builders, machinists, gun, sewing machine and carriage manufacturers, jewelers and artisans generally.

CLEVELAND FENCE COMPANY, Indianapolis, Ind.: Cleveland lawn, field, cemetery, park, school, house, church and railroad Fencing; also Iron Gates, Hitching Posts, Grape Arbors, Tennis Posts and Trellises. A catalogue illustrates these goods, also Fences, in detail and in use. The features of the Cleveland Fencing are the horizontal strands, absence of upright pickets and scroll work, the clear cut of linear design and the absence of wood posts. Attention is directed to the Automatic Tension Governor and the Horizontal Brace Corner. A price-list accompanies the catalogue.

COVERT'S SADDLERY WORKS, Farmer, N. Y.: Miniature catalogue. An illustrated catalogue No. 18, 2½ x 3¼ inches in size, gives descriptions and

list prices of Saddlery, Coach and general Hardware, including Snaps, self locking Gate and Door Hooks, Rope Clamps, Horse and Cattle Ties, rope, web and leather Halters, Buckles, Chains, Neck Yoke Centers, trimmed Neck Yokes, Straps, Wagon Jacks, Hammock Ropes, &c.

SOUTHWARK SCALE COMPANY, Philadelphia, Pa.: Standard Scales. Price-list No. 30 illustrates grocers', confectioners', counter, butchers' Steel Pivot Trip Scales, second-grade Steel Pivot Counter Scales, third-grade Counter Scales, fourth-grade Counter and Tea Scales, Hatch Counter Scales, Platform Scales, Toy Scales, &c. The company remark that they have completed their twenty-fifth year in the manufacture of Scales and that they make over 300 different styles of Scales.

THE LUNKENHEIMER COMPANY, Cincinnati, Ohio: The Lunken renewable seat Gate Valve. The manufacturers state that, on account of the practical construction of the Lunken Gates, they are simple, strong, compact, and in proportion heavy. These goods are made in iron and brass.

MENARD MFG. COMPANY, Menard, Ill.: Hollow Ware. An illustrated catalogue and price-list shows Hollow Ware enameled, ground and plain, also Sugar Kettles, Maslins, Cuspidors, &c. The line of Stove Hollow Ware includes Pots, Kettles, Spiders, Tea Kettles, Scotch Bowls, Yankee Bowls, Griddles, Ham Boilers, Waffle Irons, Loug Pans, Gridirons, Sad Iron Heaters, &c.

FERNANDO B. SMITH, Canton, Ohio: Sprinkler Exterminator, &c. Illustrations are given of this Sprinkler and Novelty Force Pump with detachable tubes designed for extinguishing fires, washing high windows, hiving bees; for washing carriages, low windows, sprinkling streets, &c.; for general sprinkling and for showering flowers, plants, vines, &c. The Pump is referred to as combining all features necessary for a first-class Force Pump, and the perforated bottom as preventing all substances from getting into the Pump that would obstruct the valves. Smith's Electric vermin exterminator and insect powder is furnished for use with the Pump.

PORTER BLANCHARD'S SONS & CO., Nashua, N. H.: Dairy and Creamery Apparatus and Supplies. A catalogue of 79 pages illustrates family and factory Churns, Separators, Creamers, Cooling Vats, Butter Workers, Butter Molds, Prints, Shipping Boxes, Packages, Wooden Ware, &c.

GURNEY REFRIGERATOR COMPANY, Fond du Lac, Wis.: Gurney Refrigerators. An illustrated catalogue and price-list gives views of the interior construction and means of ventilation, also of hardwood Refrigerators of various sizes and styles for use in families, apartment houses, restaurants, hotels, grocery stores, &c., Ice Boxes and Sideboard Refrigerators. Attention is directed to the removable galvanized ice compartment to insure cleanliness; the mode of circulation, by which the air from the provision chamber in rising passes directly against and through holes in the four side walls of the ice compartment, and the placing of the waste at the end instead of at the back of the Refrigerator. The points claimed for the Refrigerators by the manufacturers are cleanliness, free circulation, economy in the use of ice, condensation and dry air, low average temperature, freedom from condensation on the inner walls, freedom from damage by the use of ice picks, proper location of drip pipe and long life. A reproduction of the regular catalogue in miniature form is also issued.

It Is Reported—

That T. T. Flynn and Angelo Walker have bought the stock of Hardware of Frank Hall of Prattsburg, N. Y., and will continue the business. Mr. Flynn was formerly a member of the firm of G. W. Peck & Co., and Mr. Walker a clerk in the same establishment.

That Charles H. Clark, Hardware merchant, of Kennebunkport, Maine, is closing out his stock.

That the Miller Hardware Company, Bay City, Mich., have been incorporated, with a capital of \$100,000.

That the Hardware store of P. Guilloz, 148 Grand River avenue, Detroit, Mich., was entered by burglars on the 28th ult. and robbed of \$40 worth of Cutlery.

That the Hardware store of A. Morehouse, Fenton, Mich., was burglarized on the 4th inst.; \$50 to \$60 worth of Hardware was carried off by the thieves.

That the firm of Darby & Reed, Hardware dealers, North Adams, Mass., have been dissolved by the retirement of Mr. Reed. J. M. Darby has purchased his partner's interest in the concern.

That the Stoddard Hardware Company have been incorporated at Minneapolis, Minn. The capital stock is \$50,000. The incorporators are F. L. Stoddard, G. P. Derickson and W. B. Miller.

That the store and Hardware business of the late James Nutter, at St. Peter, Minn., have been purchased by his sons, William, Emmett and Geo. F. Nutter, and hereafter the firm will be known under the style of Nutter Bros.

That the Hardware store of Robie & Peasley, Greeley, Col., was entered by burglars on the 1st inst., and \$100 worth of Knives and Revolvers stolen.

That A. P. Hogle's Hardware store, at New Palestine, Ind., was damaged by fire on the 28th ult.

That T. Perkins' Hardware store, Manchester, Vt., was destroyed by fire on the 2d inst.

That the Hardware store of Haley & Chesebro, Stonington, Conn., was broken into by thieves on the 28th ult. and \$150 worth of Cutlery, &c., taken.

That J. A. Collet's Hardware store, at Morgantown, Ind., was destroyed by fire on the 3d inst.

That the Hardware firm of Anderson & Farton, Stoughton, Wis., has been dissolved by mutual consent, Mr. Farton retiring. Mr. Anderson will continue the business.

That S. O. Stillman has retired from the Hardware business, at Galena, Ill., after 40 years' connection with it. His successors are W. W. Stillman, his son, and Wm. H. Stahl. The firm style will be Stillman & Stahl.

That Mr. Hemphill of Forrester, Ill., has opened a Hardware store at Polo.

That Newark & Drury, Cadillac, Mich., will put in a stock of Hardware at McBain.

That Edgar John of Maxwell, Iowa, has purchased the interest of Webster Bishop in the Hardware firm of Willard, John & Co., Cambridge, Iowa.

That Shidler & Shidler, Canton, Ill., have sold their stock of Hardware to Mitchell & Moore and have removed to South Bend, Ind., where they will probably re-enter the Hardware business.

That Mr. Holcomb of Holcomb & Evans, Creston, Iowa, has sold his interest in the firm to I. N. Fields, who, with George Evans, will hereafter conduct the business under the firm name of Evans & Fields.

That the Byers Hardware Company lost over \$18,000 by a large fire at Kaslo, B. C., on the 25th ult.

That George Henderson has purchased the interest held by the late A. J. Chrysler in the Hardware firm of Chrysler & Caskey, Ellis, Kan.

That R. G. Dalton has sold his interest in the Hardware business at La Junta, Col., to his partner, A. H. Cawthron.

That Dickson & Taylor have opened a new Hardware store at Armour, S. D.

That J. N. Duily's Hardware store, at Cleghorn, Iowa, was burglarized on the 3d inst. Fifty dollars' worth of Revolvers and Razors were stolen.

That the McQuesten & Sawyer Company, Muscatine, Iowa, have been incorporated. The authorized capital is \$50,000. The Board of Directors of the company comprises W. W. McQuesten, S. P. Sawyer and S. F. Sawyer.

That Wolverton & Byrd's Hardware store, at Spokane, Wash., was badly damaged by fire on the 3d inst.

That George Pearce has sold his Hardware stock, at Fisher, Ill., to F. B. Vennum.

That the Tompkins Hardware Company, Cripple Creek, Col., have established a branch store at Victor.

That the Hardware stock of C. F. Beck of Lyons, Neb., has been purchased by L. C. Coffin of Rolfe, Iowa, who will continue the business at the old stand.

Paints and Colors.

It should be understood that the prices quoted in this column are strictly those current in the wholesale market, and that higher prices are paid for retail lots. The quality of goods frequently necessitates a considerable range of prices.

White Lead.—While not as vigorous as it has been recently, during the past month or six weeks, the competition in Dry White Lead is still keen enough to keep prices low and irregular at all points. Thus as low as 4¢ is still quoted in exceptional instances for round lots, while 4½¢, less usual discount, stands as a common quotation. Business is momentarily slow, since grinders have sufficient stock under contract to supply their probable wants up to midsummer. Lead in Oil has been meeting with better sale, and, while not devoid of irregularity, the market is still unsettled. The National Lead Company claim to be obtaining card rate for favorite brands, but outside makes of good reputation are selling at ¼¢ @ ½¢ less in this vicinity, while a greater margin of difference between prices of "combine" and "independent" brands is said to prevail in the interior. Business improves somewhat as the season advances, but is hardly up to the average.

Red Lead.—No change has taken place in the market for this article. The domestic product has been taken in moderate quantities only, large consumers having enough stock from deliveries on old contracts to meet their wants in a great measure. Foreign stock is in limited demand, for very much the same reason. Prices are somewhat irregular, with a leaning in buyers' favor, but show no radical change.

Litharge.—The market is rather dull at present and devoid of distinctly new feature. Low grades of domestic are moving to a very moderate extent except in delivery on old contracts and purchases of the better sorts used in the Paint trade have been only fair. Prices remain about as they have ruled for several weeks and are still rather soft.

Orange Mineral.—Dealings in both French and German brands have been on a very moderate scale and the demand at present is extremely slow. There is only a routine business in domestic. Prices are rather soft, as not unusual on a dull market, but no radical changes have taken place.

Zincs.—Deliveries of various brands of domestic Oxide have been very free and there is quite general report of satisfaction with the movement in this connection. New business is rather slow, but apparently well up to the March average. Prices stand as they have been for several weeks and the market shows quite firm tone. Foreign stock has been moving out fairly in moderate quantities, at the previous line of prices.

Colors, &c.—There is nothing new to say of the market for the leading lines of Dry Colors. Grinders have been buying in a moderate way only, and the jobbing movement, while showing some increase, is hardly up to the average for the season. Oil Colors are moving out somewhat more freely in a jobbing way, but chiefly at low and rather irregular prices. Mixed Paints are selling better, but keen competition keeps prices low for all but some few high grade specialties.

Chalk, &c.—Block Chalk unchanged, receipts being moderate and the demand tame. Whiting sells in a fairly liberal way, and prices for nearly all grades remain very steady.

Oils and Turpentine.

Linseed Oil.—There is still some irregularity in prices, but the extremes are no further apart than those that were quoted last week, and it is doubtful if there is any real change in the condition of the market. As it stands, New York City crushers stand firmly at 52¢ for raw Oil made from American seed, and leading Western concerns quote 50¢ as their bottom rate for carload lots. Outside brands went at 47¢ @ 49¢, but the lower rate was strictly exceptional and for one parcel from second hands. Business is rather slow at present and chiefly of a jobbing nature.

Cotton Seed Oils.—A further decline has taken place in the market for crude. Sales have been made at 25½¢ @ 26¢ for prime quality on the spot, and relatively as low in the Southern market. The refined Oils have also softened somewhat in price, prime Summer Yellow going at 30¢ @ 31¢, and other varieties at corresponding figures. The low prices have awakened export interest, and a larger business on foreign account is confidently expected to develop shortly. Home trade purchases have improved considerably during the week.

Lard Oil.—Sales have been made at as low as 62¢ for prime present make Oil, but manufacturers are now quoting 1¢ @ 2¢ advance over that price and claim to have sold ahead of their current output to a considerable extent. Quite a good business was done in Western brands also at the decline. There is now a fairly active demand and large sales at 60¢ for popular brands could doubtless be made were manufacturers inclined to take that price.

Fish Oils.—Crude Sperm Oil is somewhat firmer. A few hundred barrels were sold at 63¢, but holders now ask 65¢. There has been some movement

in crude Whale Oil, at a low price not made public, and the demand is now very fair. Nothing new has developed in the market for crude Menhaden Oil. The several varieties of Pressed and Bleached Oils are selling to about the usual extent, chiefly in moderate quantities, at about former prices. Cod Oil is unchanged in price and rather slow of sale.

Miscellaneous.—There has been no further change in prices of Olive or Coconut Oils and the market, while rather quiet, shows steady tone. Mineral Oils are selling fairly at practically unchanged prices.

Spirits Turpentine.—Prices have weakened a fraction, under the influence of freer offering. Regular barrels sold at 31¢ and machine barrels at 31½¢. The market has been rather more active at the decline, however, and closed quite steady.

Roller Jack Screw.

The accompanying cuts represent a roller jack screw put on the market by Millers Falls Company, 93 Reade street, New York. As shown in Fig. 2, a series of rollers separated by wedge shaped pieces form the bearings upon which the head revolves. The head is secured in place by a screw and washer, keeping the rollers in place and

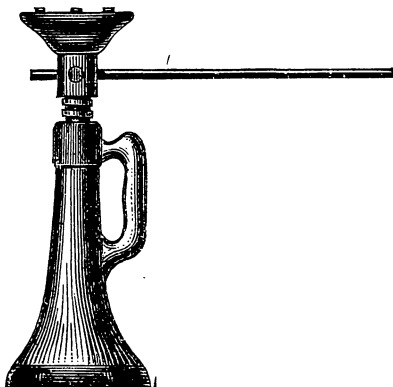


Fig. 1.—Roller Jack Screw.

excluding dirt. The manufacturers state that the rollers will stand any load that the jack will carry; that they are not liable to get out of order, and that by their use there is a saving of 40 per cent. in the power required to lift a given weight. The point is made that

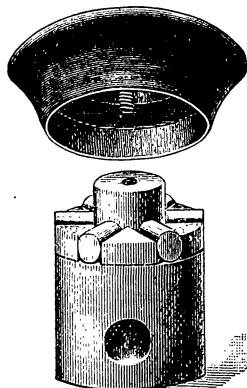
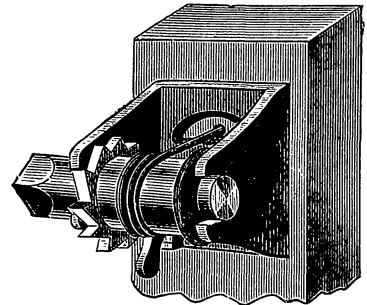


Fig. 2.—Roller Jack Screw Head.

the price is about 10 per cent. more for roller jacks, and the gain is 40 per cent. The jacks are made in 17 sizes, with wrought iron screws cut in a lathe from 1½ to 2½ inches in diameter, and with cast iron barrels from 6 to 20 inches high.

The Hollinger Wire Fence Ratchet.

The Hollinger Fence Company, Greenville, Ohio, are introducing a ratchet for use on wire fences. It is provided with a flange on the roller to prevent the wire from slipping off, and the pawl, it is stated, is fastened to the boxing so that it remains in its place and cannot drop out or get lost.



The Hollinger Wire Fence Ratchet.

It is further explained that after the ratchet is attached to the wire no part can drop out, and the roller is large and will not break the wire in tightening. The ratchets are designed to be placed on the end posts and to have line wires attached to them, to allow of taking up the slack or loosening the wires.

Acme Bells.

The accompanying cuts represent call and bicycle bells offered by the Acme Bell and Device Company, 11 Gold street, New York, and Lancaster,

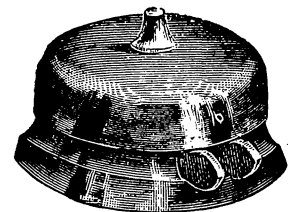


Fig. 1.—Acme Family Call Bell.

Pa. The call bell, Fig. 1, is mounted on a cast base, and is rung by pressing the projections near the base together. The bell gives a clear, silvery, electric ring, requiring no winding, and is neat and attractive in design. They are furnished in polished bronze, nickel plated, silver and gold plated. The bicycle

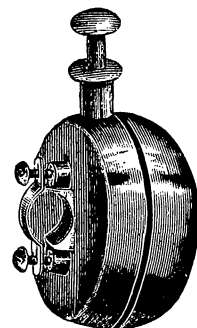


Fig. 2.—Acme Bicycle Bell.

bell, Fig. 2, has a double stroke, and is rung by pressing the button with the thumb. The manufacturers remark that in its construction they have endeavored to do away with many features that have proven objectionable in bells heretofore. These goods are finished in nickel, silver and gold plate.

The Thomas Hose Nozzle and Sprayer.

The accompanying cuts represent a hose nozzle and sprayer combined, of-

with about two-thirds as much fuel as would be required for some of the heavy plated dishes. The purity of the metal is another important consideration, as any kind of food can be cooked in such a dish with no danger of contamina-

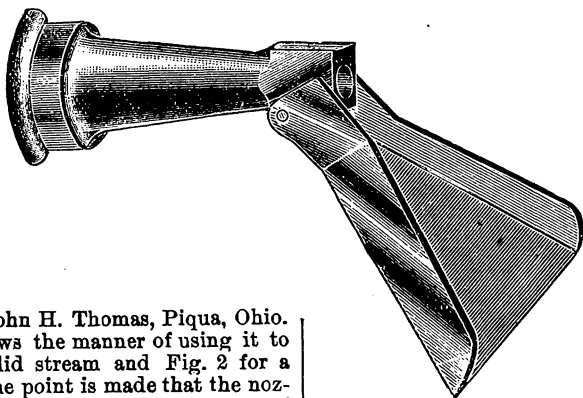


Fig. 1.—The Thomas Hose Nozzle and Sprayer.

ferred by John H. Thomas, Piqua, Ohio. Fig. 1 shows the manner of using it to throw a solid stream and Fig. 2 for a spray. The point is made that the nozzle has no valve to turn, a pressure of the thumb changing the water from a solid stream to a fine spray without changing the pressure on the hose, which pressure causes hose to give, with a tendency to collapse. The nozzle is designed for street sprinkling, watering

tion. The chafing dish is made wholly of aluminum except the handles, which are of wood, as usual. No solder is

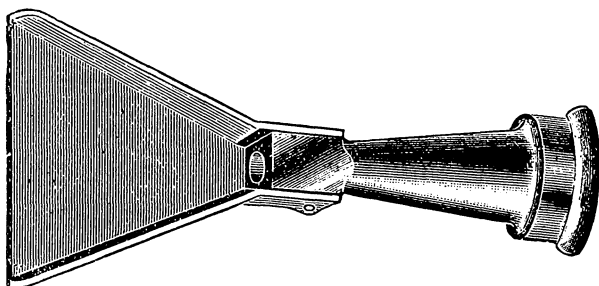


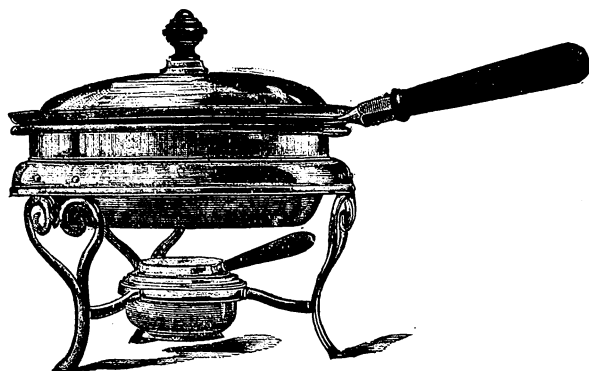
Fig. 2.—Position for Spray.

flowers, lawns, washing buggies, &c., or for any purpose for which a hose is used.

Aluminum Chafing Dish.

The Wohler Aluminum Company, 65 Jackson street, Chicago, have just placed on the market an aluminum chafing dish, herewith illustrated. There are a number of peculiar properties of

used, and the parts are therefore indestructible. The dish is made either highly polished or satin finished, closely resembling silver plate or solid silver, while it costs about the same as silver plate. The same company will soon place on the market a highly finished and elaborate tea pot, which they say will be the first to be made in aluminum in this country. It will be made with polished aluminum spout and handle. About the same time they will bring



Aluminum Chafing Dish.

aluminum which render the metal peculiarly well fitted for purposes of this character. The metal is not affected by either heat or acids and yet is an admirable conductor of heat. The heat conductivity of the metal used in making a chafing dish is an important consideration, as the fuel used is alcohol, and the claim is made that cooking can be done in an aluminum chafing dish

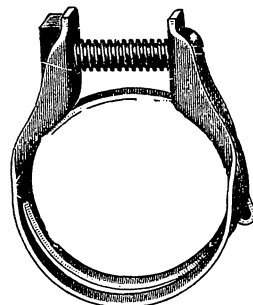
out an aluminum rice boiler, for which the patterns are already made.

E. M. ALLEN, 114 Franklin street New York, is introducing among dealers in House Furnishing Goods Aluminum Cooking Utensils and other vessels made by the Illinois Pure Aluminum Company, Lemont, Ill. This material, which is continually being

utilized for numberless purposes, is referred to in connection with culinary articles as free from poisons, unaffected by medicinal acids, durable, clean, light, and not liable to tarnish.

Sherman's Hose Clamp.

H. B. Sherman, Battle Creek, Mich., is offering an improved hose clamp, as herewith shown. It is stamped in one

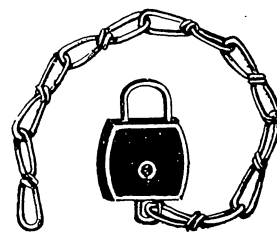


Sherman's Hose Clamp.

piece from sheet brass. The strip that is cut out from the lower part of the band is turned up under the screw to give an even grip. The manufacturer claims that the band remains always tight upon the hose; that it will not rust; that it is strong; that it can be easily taken off, and that it is as cheap as a wire band. The clamp is made in $\frac{1}{8}$, $\frac{1}{4}$ and 1 inch sizes.

Bicycle Padlock.

A bicycle padlock is shown in an accompanying illustration which has just been brought out by W. H. Diefenbacher & Co., 154 Lake street, Chicago. This lock has four levers and 150 changes of key available. It is



Bicycle Padlock.

furnished with two flat keys and a 15-inch hardened chain. The weight is $1\frac{1}{2}$ ounces, and the point is made that it can be carried in the pocket and not become burdensome. The lock is made of brass, nickel plated.

Buckeye Pruning Shear.

The Peck, Stow & Wilcox Company, 27 Chambers street, New York, have improved their French pattern pruning shear by substituting a volute for the coil spring. The volute spring is made of a spiral scroll of steel plate extended in the direction of the axis of the coil, in which direction its elastic force is extended. The company claim for this method quickness and ease of action, while the combination of spring and shape of frame permits the shear to open sufficiently wide to take in a large stick without cramping or tight action when the blades are closed. It is especially adapted to grape culture and florists' uses. This shear is made in one size, 9 inches long, and will be known as Buckeye No. 99. They still make as heretofore the three sizes of the French pattern with coil springs.

Challenge Door Bell.

The Acme Bell and Device Company, 11 Gold street, New York, and Lancaster, Pa., are introducing a door bell, as shown mounted on a stand in Fig. 1. The bell is rung by turning the knob

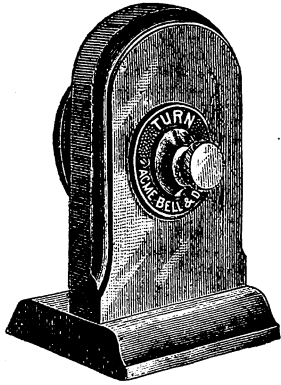


Fig. 1.—Challenge Door Bell.

in either direction, the hammer striking the gong over 100 times during each revolution of the knob. The hammer is operated by an escapement clock movement without springs, the knob crank being connected directly with the cog wheel. The round knob in Fig 1, or the T-knob in Fig 2, are supplied all of one kind or assorted, as desired. The bell is adapted to doors $\frac{1}{2}$ inch in thickness and upward, also

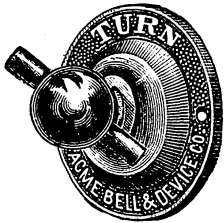


Fig. 2.—T-Knob for Bell.

to door jambs any thickness up to 18 inches. Everything necessary for putting on the bell, the manufacturers remark, is packed in the box with each bell. The bell is intended to supply a demand for a low priced article of good quality and style.

Corrugated Bicycle Tubing.

The H. W. Smith Corrugated Tube Company, 69 Broad street, Boston, and Somerville, Mass., are offering corrugated tubing as illustrated herewith. An especial feature of the tubing is the odd number of corrugations, the strength, it is stated, being manifest under the bridge principle. It is



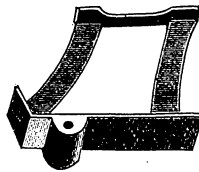
Corrugated Bicycle Tubing.

further stated that by making the tubing of an even number of corrugations the strength afforded to the even is about one-half that afforded to the uneven number. Tests made at the Watertown Arsenal by the Government indicate that 24-gauge tubing corrugated under the company's patents is about 10 per cent. stronger than round tubing of the

same diameter but of 20 gauge; or, as the manufacturers express it, where 20 gauge round tubing is to be used, it can be replaced by 24-gauge corrugated tubing, thus giving the same strength with much less weight. The tubing used in the tests at Watertown, when received by the company, was one long piece, which they cut, and corrugated one-half to show the increase of strength afforded the tubing in corrugating. The point is made that bicycles made of the tubing have proved a success and are handsomer in appearance than those made of round tubing.

Garry Shutter Eye.

The Garry Iron & Steel Roofing Company, Cleveland, Ohio, are introducing the cast shutter eye shown in the accompanying cut. The device is designed for supporting fire proof doors and shutters and is built into the wall while in process of construction, the face of the eye taking, it is stated, the space of one brick. The manufacturers remark that in constructing the eye they have been careful as to its proportions and the

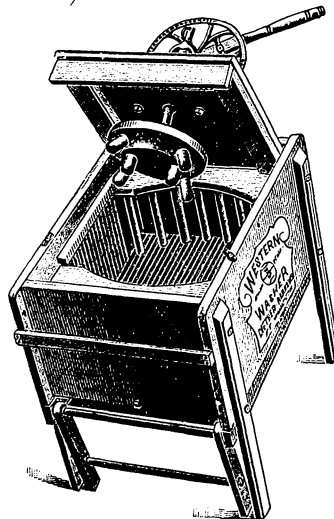


Garry Shutter Eye.

work required of it, and that they obtain the greatest possible strength with the least material, thus lessening the cost. The company also manufacture an eye for putting through the wall with a nut and washer on the inside, in case the walls are already built, and one that can be set into the wall in plaster of paris or cement without disturbing the plaster on the inside of the building.

The Western Standard Washer.

Diether & Barrows, Fort Wayne, Ind., are offering the washing machine shown in the accompanying cut. An important



The Western Standard Washer.

feature of the machine is a galvanized steel shifting shaft, to which a rubber or pin wheel is attached. The shaft is described as having a free perpendicular movement through the gear wheel,

quickly adjusting the rubber or pin wheel to any quantity or condition of the clothing in the washer. The manufacturers claim that the galvanized steel shafts will not shrink, swell, rust, rot, split or break, and that the gearing will adapt itself to a single piece or a tubful, washing any intermediate quantity to perfection. The washers are made in sizes Nos. 2 and 3.

New Creasey Ice Breaker.

The illustrations herewith show the new designs of No. 2 Creasey ice breaker which Joseph S. Lovering

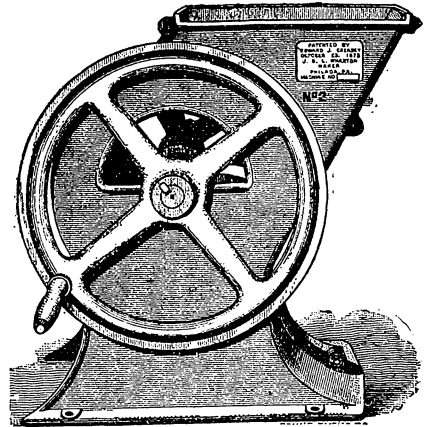


Fig. 1.—No. 2 Creasey Ice Breaker.

Wharton, Germantown Junction, Philadelphia, is putting on the market. Fig. 1 shows the machine for hand power only, while Fig. 2 shows the same machine arranged for both hand and power. The old pattern of the

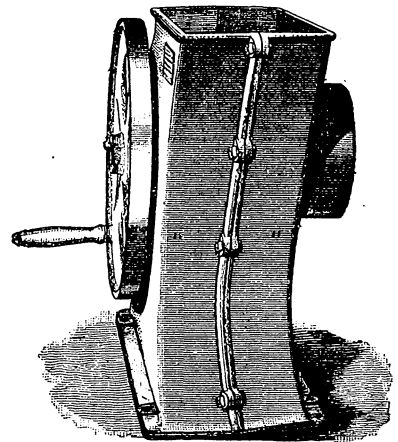


Fig. 2.—No. 2 Creasey Ice Breaker.

machine has a wrought iron cover or back, which is dispensed with in the new pattern, giving, it is claimed, greater strength and rigidity to the machine. The new machine is described as possessing the following advantages over the old pattern: It has a well proportioned fly wheel for storing power; turned steel shafts in both styles; heavier frames; increased width between the sides, and a larger hopper. It is claimed for the machines that they are compact, durable, easy running, and extremely rapid cutters; that they are fitted with drop forged, annealed and tempered teeth or picks; and that, like all the styles of Creasey machines, they cannot be clogged with ice.

The Buckeye Pneumatic Tire.

Gendron Iron Wheel Company, Toledo, Ohio, are using the Buckeye pneumatic tire on their 1894 wheels, as il-

hole is flanged out to avoid cutting the stem and also to strengthen the rim. There is a double row of rasp shaped teeth all around the bottom of the rim to prevent the creeping of the tire. The rim also has two cross pins, one on each

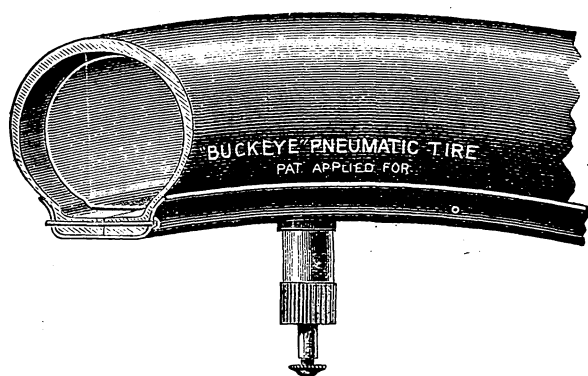


Fig. 1.—The Buckeye Pneumatic Tire.

lustrated in Figs. 1, 2 and 3. The air tube is endless, and is completely encircled by the outer cover, to make it impossible for the inner tube to burst or spring a leak, it being evenly pressed, it is stated, against a smooth circular

side of the valve stem, passing through the sides of the rim and through the lacing holes of the tire. The point is made that either one of these devices alone would prevent the tire creeping. The manufacturers remark that the rim

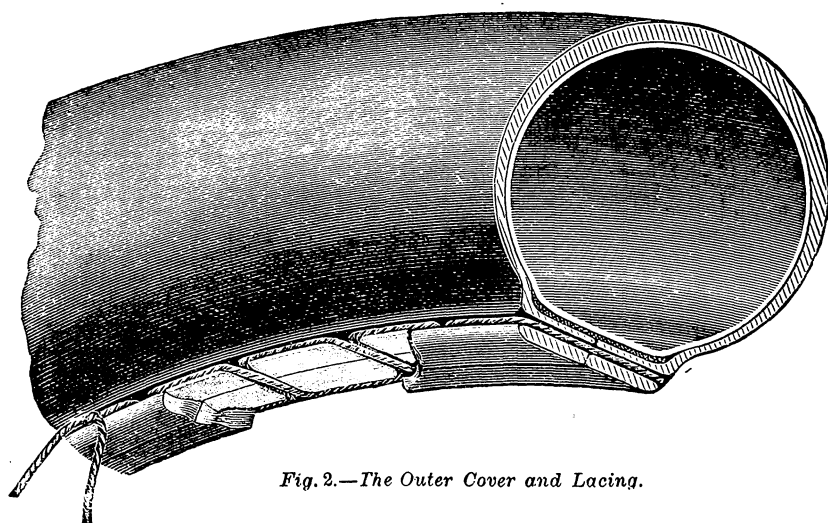


Fig. 2.—The Outer Cover and Lacing.

wall. There is also a bridge strip across the seam at the base of the outer cover. The outer cover, Fig. 2, is split at its base and laced all around, but in eight sections, so that when punctured only one section need be unlaced. The lacing holes through the base and the side grooves enditching the cord are vul-

and tire were in constant use under the severest test for many months before they were adopted by the company and that no faults whatever developed.

Pennsylvania Railroad officials are making careful experiments to test the

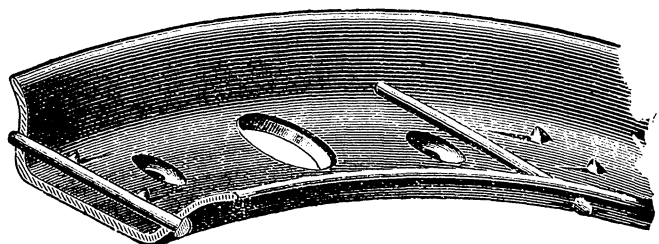


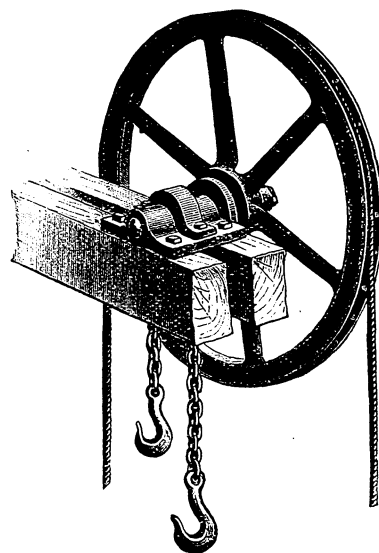
Fig. 3.—The Rim.

canized in the mold. The rim, Fig. 3, is referred to as light, yet strong. The nipple holes are embossed instead of being countersunk, and the valve stem

value of the Harveyizing process as applied to tires, crank pins, axles and other parts of rolling stock subject to rapid wear.

Gleason's Double Lift Safety Hoist.

The cut herewith shown is of a double lift safety hoist which the Henry C. Ayer & Gleason Company, Second and Diamond Streets and Betz Building, Philadelphia, are putting on the market. The hoist consists of a chain sheave wheel, over which passes a chain with a hook fastened to each end, the chain being raised and lowered by a hand rope and wheel, in conjunction with automatic mechanism. The automatic mechanism is contained in a housing of iron in one piece, being a round box having an extension bolting plate and large bearings, with an opening for a sprocket wheel. An iron sprocket wheel is connected to a steel shaft pass-



Gleason's Double Lift Safety Hoist.

ing through the housing. The holding mechanism is contained in three pieces, an expanding friction ring, steel dog and a knock off. In operation the load hanging on the sprocket has a tendency to turn the latter. The knock off being connected with the shaft strikes the steel dog, and the dog, being an eccentric and working in connection with the expanding friction ring, expands the latter against the housings and the load is instantly held. In disengaging, a similar knock off on the pull wheel strikes against the steel dog, relieves the pressure on the friction ring and the load is again in motion. The action of the friction ring, it is stated, is so positive and easy that there is no jerky motion or slip, and that upward or downward motion continues just so long as there is a pull on the pull wheel. Pulling one side of the rope causes the load to ascend, and a pull on the other side of the rope causes it to descend. With a stoppage of pulling the load remains suspended. Every part of the hoist is described as being strong and interchangeable, and every hoist made is tested to three times its listed capacity. In the construction of the hoist a safety factor of six is observed, and it is fully guaranteed by the makers. It is represented as being particularly applicable for use in mills, factories, stores and freight houses, and, in fact, any place where a good, safe quick and substantial hoist is needed. It is made in four sizes, running from 500 to 2000 pounds capacity.

The Gleason Branson Chainless Safety.

The accompanying illustrations show the chainless safety bicycle which John Branson, 2221 North Front street, Philadelphia, is putting on the market. The novel feature is in the driving mechanism, which dispenses with a chain and sprocket. Fig. 1 shows the

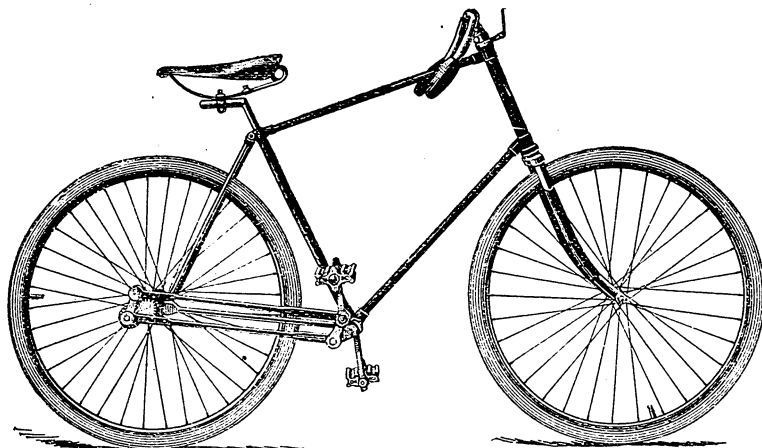


Fig. 1.—The Gleason-Branson Chainless Safety.

bicycle complete. Fig. 2 shows the driving mechanism, consisting of two light parallel rods used in conjunction with two small cranks, the cranks being placed in such a position, it is stated, that at no time is it possible to exert power except in a rectilinear line through the driving axis of the wheel, the impelling force being applied theoretically to the wheel at each 90° of its revolution, thus entirely overcoming dead points. The two gears shown are of steel. The driven gear connected to

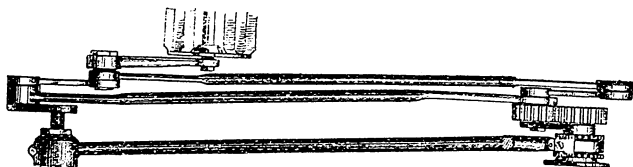


Fig. 2.—The Gleason-Branson Driving Mechanism.

the axle of the wheel is 2 inches in diameter. The driving gear is a little larger and is connected to one of the cranks in such a manner as to gear the wheel up to 60 inches, although it is capable of being geared up to any size desired. The bicycle is fitted with adjustable ball bearings throughout. The advantages claimed for the bicycle are as follows: That there is no chain to stretch, lose pitch and become slack; that one-third more power is obtained, owing to the reduction in friction; that the rider experiences no jerky feeling, and that there is a more uniform application of power, consequently less work for the rider, and less reliance on momentum.

Willer Mfg. Company of Milwaukee, Wis., are making window screens and screen doors to order, making a specialty of furnishing fine residences and other buildings. They make sliding screens to cover one-half the window and slide up and down, but staying at any point, being balanced by a spring designed by the company. They also make stationary screens to cover the entire window, the same as an outside blind. They further make screen doors from their own designs, single and

double, covering a very great variety of plain and fancy styles. The company take the measurements of a house and attend to all details in fitting it with the proper window screens and screen doors. They issue handsome catalogues devoted to these matters and a special catalogue on screen door hardware. Branch offices are maintained at room 25 Adams Express Building, Chicago, and room 307 Fagin Building, St.

Louis, in charge of representatives, who look after the interests of the company in those localities.

The Ellis Warming Box.

J. T. Ellis, manager, box 262, Newark, N. J., is offering a warming box as illustrated herewith. The box, as shown without the cover by a two thirds sized cut in Fig. 1, is entirely of metal with an opening in the center 1½

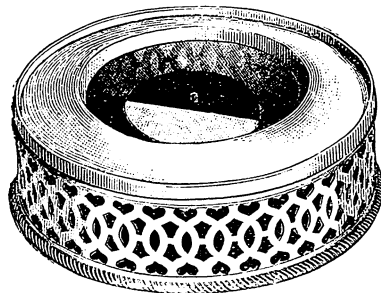


Fig. 1.—The Ellis Warming Box.

with a hole in the center, which is placed on a pin in the center of the opening. This is lighted with a match, after which the cover is put on the box, having lugs for holding it securely in place. Air is provided through the openings in the walls or sides of the box to allow of slow combustion; one

carbon, it is stated, giving heat for about two hours. Fig. 2 represents the box in a ring or handle, which allows of handling the box when heated. The box is designed for relieving pain by the application of heat in a more convenient form than hot

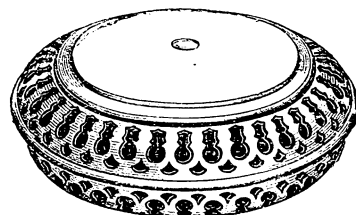
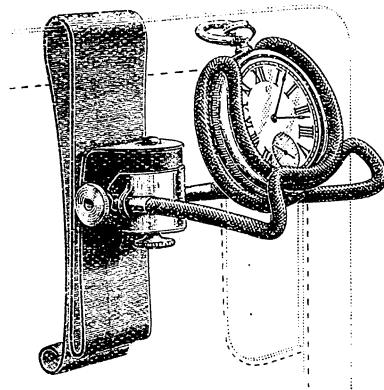


Fig. 2.—Warming Box in Ring.

water bags, bricks, &c.; to be used in case of earache, neuralgia, toothache, lumbago, rheumatism, colic, &c. The point is made that the box may also be used to advantage for keeping warm the hands of street car drivers, conductors, policemen, coachmen, teamsters, postmen, mechanics, farmers, school children, also ladies when shopping, calling, walking or driving. The box with rim measures 3½ inches in diameter, weighs 5½ ounces and is finished in nickel plate. The manufacturer claims that the heater burns freely in the pocket or other receptacle without flame, smoke or unpleasant odor when closed. Twelve carbons accompany each heater and additional carbons are packed 100 in a box.

Burleigh's Watch Carrier and Rein Holder.

The cut herewith represents a watch carrier and rein holder offered by George K. Burleigh, Tilton, N. H. The carrier is of spring wire, covered with black woven fabric, the wire being arranged at an angle to secure the working parts of the watch



Burleigh's Watch Carrier and Rein Holder.

from injury. The carrier is attached to a 1½ inch metallic band, folded in such a manner as to go over the dash of a carriage or buggy. The opening between the inside fold of the band answers as a rein holder. The carrier is shown in the cut over an outlined dash, the watch in a position to face the driver. The carrier is adapted to hold either a 16 or 18 sized watch, watch clock, or a 2-inch clock, and is designed for use by doctors, stage drivers and by those who ride continuously. The carrier is also made for attaching to bicycles, as illustrated in *The Iron Age* March 15, 1894.

Current Hardware Prices.

MARCH 21, 1894.

Note.—The quotations given below represent the Current Hardware Prices which prevail in the market at large. They are not given as manufacturers' prices, and manufacturers should not be held responsible for them. In cases where goods are quoted at lower figures than the manufacturers name, it is not stated that the manufacturers are selling at the prices quoted, but simply that the goods are being sold, perhaps by the manufacturers, perhaps by the jobbers, at the figures named.

The character @ is used to indicate a range of price; thus discount 50&10@50&10&5 signifies that the goods in question are sold at prices ranging from discount 50 and 10 % to discount 50 and 10 and 5 %.

Adjusters, Blind—

Domestic..... doz \$3.00, 33% @ 33% & 10%
Excelsior..... doz \$10.00..... 50&10&2%
North's..... list net @ 10%
Zimmerman's—See Fasteners Blind.

Ammunition—See Caps, Cartridges, Shells, &c.

Anvils—

American—
Eagle Anvils, 9 in. 15&15&5%
Horse shoe brand, Wrought..... 11@11%
Moore & Barnes Mfg. Co..... 33%
Imported—
Armitage Mouse Hole..... 10% @ 11%
E. & H. machine..... 10% @ 11%
Trenton..... 10% @ 10%
Wilkinson's..... 10% @ 11%
Peter Wright's..... 11@11%

Anvil Vise and Drill—

Allen Anvil and Vise \$3.00..... 40&10%
Cheney Anvil and Vise..... 25%
Millers Falls Co., \$18.00..... 45&5%
Star..... 45&5%

Apple Parers—See Parers Apple, &c.

Augers and Bits—

Boring Machine Augers..... 70@70&10%
Car Bits, 12-in. twist..... 30&10%
Common Augers and Bits..... 70@70&10%
Cincinnati Bell Hangers' Bits..... 30&10%
Forstner Pat. Auger Bits..... 15%
Jennings' Pattern Car Bits..... 40%
Jennings' Pattern Auger Bits..... 60%
C. E. Jennings & Co., No. 10, extension 11p..... 40%
C. E. Jennings & Co., No. 30..... 60%
C. E. Jennings & Co. Auger Bits, set 32% quaters, No. 5, \$5; No. 30, \$3.50, 25%
Russell Jennings' Augers and Bits, 25&10%
Lewis' Patent Single twist..... 45%
L'Hommedieu Car Bits..... 15&10%
Fugh's Black..... 30%
Fugh's Jennings' Pattern..... 30%
Snell's Bits..... 60&5%

Bit Stock Drills—

Cleveland..... 50&10&5%
Cincinnati, for wood..... 30&10%
Cincinnati, for metal..... 45&10%
Morse Twist Drills..... 50&10&5%
New Process Twist Drill Co..... 60&10&5%
Standard..... 50&10&5%
Syracuse, for metal..... 50&10&5%
Syracuse, for wood (wood list), 30&30&5%

Expansive Bits—

Clark's small, \$18; large, \$26. 35&35&10%
Ives' No. 4, doz. \$60..... 40%
Steer's No. 1, \$26; No. 2, \$18..... 35&40%
Stearns' No. 2, \$48..... 20%
Swan's..... 40%

Gimlet Bits—

Bee..... 25&25&5%
Common..... gross \$2.70 @ \$3.25
Diamond..... doz \$1.25 @ 40&10%
Double Cut..... 30&10%
Ct. Valley Mfg. Co..... 30&10%
Hartwell's..... gross \$10.00 @ 40&10%
Dougllass..... 40&10%
Ives..... 60&60&10%
Shepardson's..... 45&45&10%

Hollow Augers—

Bonney's Adjustable..... 50%
Cincinnati Adjustable..... 25&10%
Cincinnati Standard..... 25&10%
Dougllass..... 33% @ 33% & 10%
French, Swift & Co. (Beecher)..... 33% @ 33% & 10%
Ives' Expansive, each \$4.50..... 60&5%
Ives' Expansive, each \$4.50..... 60&5%
Stearns' Universal Expansive, each \$4.50..... 20%
Wood's..... 25&25&10%

Ship Augers and Bits—

L'Hommedieu's..... 15&10@15&10&5%
Snell's..... 15&10@15&10&5%
Snell's Ship Auger Pattern Car Bits..... 15&10@15&10&5%
Watrous's..... 25&25&10%

Awl Hafts—See Hafts, Awl.

Awls—

Brad, Handled..... gr. \$2.50 @ \$3.00
Brad, Shouldered..... gr. \$1.30 @ \$1.40
Feg, Pat..... gr. 35¢ @ 38¢
Feg, Shouldered..... gr. \$1.50 @ \$1.55
Scratch, Handled..... gr. \$4.00 @ \$4.50
Scratch, Socket..... doz. \$1.10 @ \$1.20

Awl and Tool Sets—See ts, Awl and Tool.

Axes—

First quality, best brands..... Plain. Beveled. \$7.00 \$7.50
First qual., other brands..... 6.00 7.00
Second quality..... 5.50 6.00

Axle Grease—See Grease, Axle.

Axles—

No. 1..... 3 1/4 @ 4 1/4; 4 1/4 @ 5 1/4
Nos. 7 to 14..... 70%
Nos. 15 to 28..... 47%
Nos. 19 to 22..... 47%
Concord Axles, loose collar..... 8% cash
Concord Axles, solid collar..... 5¢ @ 6¢

Bag Holders—See Holders, Bag.

Balances—

Sash—
Pullman..... 60%
Spring—
Spring Balances..... No. 2000 20 80
Chatillon, doz..... \$0.80 0.95 1.75 net
Chatillon Straight Balances..... 40%
Chatillon Circular Balances..... 50&10%

Barb Wire—See Wire, Barb.

Bars—

Crow—
Cast Steel..... doz 3 1/2
Iron, Steel Points..... doz 3 1/2

Basins, Wash—

Standard Fiberglass, No. 1, 10 1/2-in. \$1.80;
12-in., \$2.00; 13 1/2-in., \$2.50; 15-in., \$3.00.

Beams, Scale—

Scale Beams, List Jan. 12, '82..... 60&10%
Chatillon's No. 1..... 40%
Chatillon's No. 2..... 50&10@50&10&5%
Custer's..... 33%

Beaters—

Egg—
Bryant's..... gross \$14.00
Double (H. & R. Mfg. Co.), gross, No. 0 \$12.00; No. 1, \$15.00; No. 2, \$36.00
Dover..... doz \$1.00 @ \$1.20
Dover (Standard Co.)..... doz \$1.00
Duplex (Standard Co.)..... doz \$1.00
Duplex Extra Heavy (Standard Co.)..... doz \$3.50
Easy (H. & R. Mfg. Co.)..... gro \$12.00
Improved Acme (H. & R. Mfg. Co.)..... \$4.00
Silver & Co..... doz \$5.50
Spiral..... gro \$4.25 @ \$4.50
Triple (H. & R. Mfg. Co.)..... gro \$15.50

Culinary—

Keystone, P. D. & Co., Each, No. 1, \$1; No. 2, \$2..... 20%

Bells—

Cow—
Common Wrought..... 60&10%
Kentucky Durham..... 70&10%
Kentucky, Sargent's list..... 70&10%
Kentucky, "Star"..... 20&10%
Texas Star..... 50&10@50&10&5%
Western, Sargent's list..... 70&10%

Door—

Crank, Brooks's..... 50&10&2%
Crank, Cone's..... 10%
Crank, Cone's..... 20&10%
Gong, Ahbe's..... 35&10%
Gong, Barton's..... 40&10@50%
Gong, Yankee..... 45&10%
Lever, R. & E. Mfg. Co.'s..... 60&10&2%
Lever, Sargent's..... 60&10%
Lever, Taylor's Bronzed or Plated..... net
Lever, Taylor's Japanned..... 25&10%
Full, Brooks's..... 50&10&2%

Electric—

Bigelow & Dowse..... 20%
Wollensaks..... 20%

Hand—

Extra Heavy Brass..... 70%
Light Brass..... 70&10@70&10&5%
Saver Chime..... 35% @ 10%
White..... 70%
Globe Cone's Patent..... 25&10@35%

Miscellaneous—

Call..... 45&50%
Farm Bells..... 70&10&5%
Steel Alloy Church and School Bells..... 40%

Bellows—

Blacksmith's..... 60&10&5@60&10&10%
Hand Bellows..... 40&10@50%
Molders'..... 40&10&5%

Belting, Rubber—

Common Standard..... 75&75&10%
Extra..... 60&10@60&10&10%
Standard..... 70&5@70&10%
N.Y.B. & P. Co., Carbon..... 60&60&5%
N.Y.B. & P. Co., Diamond..... 50&50&5%
N.Y.B. & P. Co., Para..... 40&40&5%

Bench Stops—See Stops, Bench

Benders and Upsetters, Tire—

Detroit Perfected Tire Bender..... 15%
Green River Tire Benders and Upsetters..... 20%
Stoddard's Lightning Tire Upsetters..... 15%

Bits—

Auger, Gimlet, Bit Stock Drills, &c., see Augers and Bits.

Bit Holders—See Holders.

Blind Adjusters—See Adjusters, Blind.

Blind Fasteners—See Fasteners, Blind.

Blind Staples—See Staples, Blind.

Blocks—

Cleveland Block Co., Mal. Iron, 50&10&6%
Moore's Novelty, Mal. Iron..... 50%
Sure Grip Steel Tackle Blocks..... 25%
See also Machines, Hoisting.

Bolts—

Carriage, Machine, &c.—

Com. list June 10, '84..... 80&10@80&10&5%
Genuine Eagle, Norway, list Oct. '84..... 80&5@80&10%
Eagle, Norway, list Oct. '84..... 80&5@80&10%
Phila. pattern, list Oct. '84..... 80%
R.B. & W., old list..... 70%
Roll Ends, list Jan. 1, 1890..... 80&10@80&20%
Machine, list Jan. 1, 1890..... 80&10@80&20%

Door and Shutter—

Cast Iron Barrel, Square, &c..... 75&10%
Cast Iron Chain (Sargent's list)..... 65&10@65&10&5%
Cast Iron Shutter Bolts..... 75&10%
Ives' Patent Door Bolts..... 60&10@60&10&10%
Wrought Barrel..... 70%
Wrt B. K. Flush, Common..... 55&10%
Wrt Shutter, Brass Knob 50&10@50&10&5%
Wrt Shutter, Sargent's list..... 60&10%
Wrt Shutter, all Iron, Stanley's..... 60&10@60&10&10%
Wrought Square..... 75&10%
Wrt Sunk Flush, Sargent's list..... 60&10%
Wrt Sunk Flush, Stanley's list, 50&10@50&10&10%

Stove and Plow—

Plow..... 60&10&5@60&10&10%
Stove..... 60&10@60&10&10%
R. B. & W., Plow..... 55%

Tire—

Common, list Feb. 28, '83..... 65&65&10%
American Screw Company..... 80%
Norway, Phila., list Oct. 16, '84..... 75%
Eagle, Phila., list Oct. 16, '84..... 80%
Phila., list Oct. 16, '84..... 80%
Bay State, list Feb. 28, '83..... 65%
Port Chester Bolt and Nut Company..... 65%
Empire list Feb. 28, '83..... 65%
Keystone, Philadel., list Oct. '84..... 80%
Norway, Phila., list Oct. '84..... 75%
R. B. & W., Philadel., list Oct. 16, '84..... 80%

Borers, Tap—

Common and Ring..... 20&10%
Clark's..... 33% @ 35%
Enterprise Mfg. Co..... 20%
Ives' Tap Borers..... 33% @ 35%

Boring Machines—See Machines, Boring.

Box Pins—See Pins, Box.

Boxes, Wagon—

Per doz..... 24%
Boxes, Miter..... 24%
Spilker's Excelsior, 3 in. \$7.50, 4 in. \$8.50, 5 in. \$13.00, 6 in. \$15.00..... 20%

Braces

American Bit Brace and Tool Co..... 40&10%
Nos. 10, 12, 20..... 70&10%
Nos. 11, 21, 24, 27..... 70&10%
Nos. 22, 25, 28..... 60&10&5%
Nos. 13, 26, 38, 37..... 70&10&5%
Amidon's..... 75&10@80%
Barker's Imp'd Plain..... 65&10@70%
Barker's Imp. Nickeled..... 75&10@80%
Ratchet..... 60%
Eclipse Ratchet..... 40&40&10%
Globe Jawed..... 40&40&10%
Corner Brace..... 40&40&10%
Universal, 3 in., \$2.10; 10 in. \$2.25
Buffalo Ball..... \$1.10 @ \$1.15
Barber's..... 50&10%
Bartholomew's..... 50&10@60&5%
Nos. 25, 27 and 30..... 60&10@60&5%
Nos. 117, 118, 119..... 70&70&5%
Common Ball, American..... \$1.00 @ \$1.10
Davis Patent..... 60&10%
Fray's Genuine Spofford's..... 50&5@50&10%
Fray's Nos. 70 to 120, 81 to 123, 207 to 414..... 50&10%
Ives' New Haven Novelty..... 70&70&5%
New Haven Ratchet..... 60&5@60&10%
Barber Ratchet..... 60&5@60&10%
Barber's..... 60&5%
Spofford..... 60&5@60&10%
P. S. & W. Co. Peck's Patent..... 60%
Rose & Johnson..... 50%
Saxton's..... 75&10@80%
Barker's Imp. Polished..... 65&10@70%
Barker's Imp. Nickeled..... 65&10@70%
Ratchet, Polished..... 50&10@60%
Ratchet, Nickeled..... 40&10@50%
Buffalo Ball..... net, \$1.10 @ \$1.15

Brackets—

Shell, fancy, Sargent's list..... 70&70&10%
Other makes at a wide range of prices.
Shell, plain, Regular, list..... 65&70%
Sargent's list..... 60&10@70&10%
Bradley Shelf Brackets..... 70&10%

Bright Wire Goods—See Wire.

Broilers—

Hemis Self-Inch..... 6 10 9x11
Basting..... Per doz. \$4.50 5.50 6.50
Morgan Odorous..... doz. \$12, 50%
New Haven..... 60%
Quebec City..... 35%
Wire Goods Co..... 65&10%

Buckets, Well—

Galvanized—

Helwig's Flat Iron Band..... \$3.75
Helwig's Wired Top..... doz \$4.00
Hill's..... doz. 12 qt. \$4.25; 14 qt. \$5.25
Iron Clad..... doz. 14 qt. \$4.25 @ \$4.50

Bull Rings—See Rings, Bull.

Butcher's Cleavers—See Cleavers, Butcher's.

Butts—

Brass—
Cast Brass, Fast..... 33% @ 10%
Cast Brass, Loose Joint..... 33% @ 10%
Cast Brass, Tiebout's..... 60%
Wrought Brass..... 80&10@80&10&5%

Cast Iron—

Fast Joint, Broad..... 60&10&5%
Fast Joint, Narrow..... 60&60&5%
Loose Joint..... 75&10%
Loose Joint, Japanned..... 80%
Loose Joint, Jap. with Acorns..... 75&10%
Loose Pin, Acorns..... 75&10%
Loose Pin, Acorns, Japanned..... 80%
Loose Pin, Acorns, Japanned, Plated Tips..... 80%
Mayer's Hinges..... 80%
Parliament Butts..... 80%

Wrought Steel—

Fast Joint, Broad..... 75&10%
Fast Joint, Narrow..... 75&10%
Fast Joint, Lt. Narrow..... 75&10%
Inside Blind, Light..... 75&10%
Inside Blind, Regular..... 75&10%
Loose Joint, Broad..... 75&10%
Loose Pin..... 75&10%
Table Butts, Back Flaps, &c..... 75&10%
Bronzed Wrought Butts 50&10@50&10&10

Cages, Bird—

Heidryx, Brass..... 10&50%
Heidryx, Enameled..... 40&10@50%

Callipers—See Compasses

Calks Toe—

Burke's, One Prong, Blunt..... 4% @ 5%
Burke's, One Prong, Sharp..... 5% @ 6%
Burke's, Two Prong, Blunt..... 5% @ 6%
Burke's, Two Prong, Sharp..... 5% @ 6%
Gautier, One Prong, Blunt..... 5% @ 6%

Can Openers—See Openers, Can.

Cans, Milk—

S. S. & Co., 5-gal. \$3.00; 8-gal. \$4.40;
10-gal., \$4.75 each..... 40&10

Cans, Oil—

Galvanized Blue Band, 1 gal., doz. \$2.25
Galvanized Blue Band, 5 gal., Tip-Top, doz. \$12.00
Galvanized Blue Band, 5 gal., Faucet, doz. \$3.00
Glass Oil, Friend..... doz. \$2.75

Caps—

Percussion—
Hicks & Goldmark's and Union Metallic Cartridge Co..... \$1.00
Eley's E. B..... 55&55%
Eley's D Waterproof, Central Fire, \$1.60
E. B. Grad. Edge, Cent. Fire, 1-10's..... 47&50%
E. B. Trimmed Edge, 1-10's..... 47&50%
F. L. Waterproof, 1-10's..... 35&37%
G. D..... 27%
Musket, Waterproof, 1-10's..... 50&53%
S. B. Genuine Imported..... 45&45%

Primers—

Berdan Primers, \$1.00..... 2%
B. L. Caps (Sturtevant Shells) \$1.00..... 2%
All other Primers, \$1.20..... 2%

Cards

Watson's Cotton, Wool, Horse and File, list January 23, 1891..... 25%

Carpet Stretchers—See Stretchers, Carpet.

Cartridges

B. B. Caps, Co. Ball, Swgd., \$1.85 @ \$1.90
B. B. Caps, Round Ball..... \$1.60 @ \$1.65
Blank Cartridges, except 22 and 32 cal., additional 10% to above discounts.
Blank Cartridges, 22 cal., \$1.75..... 2%
Blank Cartridges, 32 cal., \$3.50..... 2%
Cent. Fire, Military and Sporting..... 15&15&2%
Cent. Fire, Pistol and Rifle..... 25&25&2%
Primed Shells and Bullets..... 15&15&2%
Rim Fire Cartridges..... 50&5&2%
Rim Fire Military..... 15&15&2%

Carpet Sweepers—See Sweepers, Carpet.

Casters—

Bed..... } Brass..... 55&55&10%
Plate..... } Others..... 60&60&10%
Shallow Socket..... 40&10%
Deep Socket..... 40&10%
Giant Truck Casters..... 35%
Gwinner's Common Sense..... 45%
Gwinner's Hercules..... 45%
Martin's Patent (Phonix), 45&10@50&10%
Payson's Anti-friction..... 70&70&10%
Payson's Truck..... 60&60&10%
Socket Truck Casters..... 50&50&10%
Stationary Truck Casters..... 50&50&10%
Tucker's Patent, low list..... 45%
Yale Casters, low list..... 45%
Yale, Gem..... 70%

Cattle Leaders—See Leaders, Cattle.

Cement—

Victor Elastic..... 5 lb pails 75¢

Chain

American Coll. in cash lots.....
2-16 5-16 7-16 1-2 3-4 5-8
\$7.00 5.30 4.45 3.80 3.65 3.50 3.40 3.25
Less than cash lots, add 1/4 @ 1/2 %
German Coll. list July 12, 1892 60&60&10%
German Halter Chain, list July 12, 1892..... 60&60&10%

Trace, Wagon and Fancy Chains.

List revised May, 1893..... 60&60&10%
Barnes' Reinforced Sash..... 60&10%
Barnes' Victor Sash..... 65%
Covert Halter..... 60&2%
Covert Reel Chain..... 55&

Chalk Lines—See Lines. Checks, Door—

Unity.....50%

Chisels

Socket Framing and Firmer

Ohio Tool Co.....75&10@75&10&10%

P. S. & W.....30%

Wetherby.....30%

Buck Bros.....30%

Charles Buck.....30%

Douglas.....75&10@75&10&10%

Merrill.....60&10@60&10&10%

L. & J. White.....30&30&25%

Tanged and Miscellaneous.

Buck Bros.....30%

Charles Buck.....30%

Butchers.....\$4.70@55.00 to 2

Spears & Jacksons.....\$5 to 2

Tanged Filmmers.....50&20&10%

Cold Chisels, fair quality, \$1.14@20%

Chucks—

Beach Pat.....each, \$8.00.....20%

Danbury.....each, \$6.00, 30@30&25%

Graham Patent.....30%

Morse's Adjustable, each, \$7.00, 20@25%

Eracuse, B. & B. Mfg. Co.....25%

Skinner's Patent Chucks.....33&14%

Combination Lathe Chucks.....15%

Drill Chucks.....15%

Independent Lathe Chucks.....40%

Universal Lathe Chucks.....40%

Union Mfg. Co.....40%

Combination.....40%

Independent.....40%

Universal.....40%

Victor.....\$8.50, 25%

Churns—

McDermott Star Barrel Churn, each

6 gal., \$2.60; 10 gal., \$2.75; 15 gal.,

\$3.00, 20 gal., \$3.25.

Tiffin Union, each, 6 gal., \$3.25; 7 gal.,

\$3.75; 10 gal., \$4.25.

Clamps—

Adjustable, Cincinnati.....15&10%

Adjustable, Hammers.....15&15&5%

Adjustable, Stearns.....30&30&10%

Barnes' Machine's Clamps.....70&10%

Cabinet, Sargent's.....70&10%

Carpenter's, Cincinnati.....25&10%

Carriage Makers, P. S. & W. Co.....40&10%

Carriage Makers, Sargent's.....75&10&5%

Eberhard Mfg. Co.....40&5&10&10%

R. I. Tool Co.'s Wrought Iron.....25%

Saw Clamps, see Vices, Saw Filers.....

Stearns' Malleable, with Wrought Iron

Screw.....75&10&5%

Warner's.....40&10&40&10&5%

Cleavers, Butchers—

Beatty's.....40&10&5%

Bradley's.....25&30%

Foster Bros.....30%

New Haven Edge Tool Co.'s.....30%

Nichols Bros.....30%

P. S. & W.....33&14&5&33&14&10%

Schulte, Lohoff & Co.....40&10&5%

L. & J. J. White.....20&25%

Clips—

Baker Axle Clips.....25%

Norway Axle Clips.....65&5%

Norway Spring Bar Clips.....60&5&5%

2d grade Norway Axle Clips.....65&5%

Steel Felloe Clips.....\$1.40, 4%

Superior Axle Clips.....70%

Wrought Iron Felloe Clips.....\$1.50, 5%

Cloth and Netting, Wire

—See Wire, &c.

Cockeyes.....50%

Cocks Brass

Hardware list (Globe, Kerosene, Lever

Bibbs, Racking, &c.).....60&2@60&10

Coffee Mill—See Mills, Coffee.

Collars, Dog—

Brass, Pope & Stevens' list.....40%

Chapman Mfg. Company, new list.....40%

Embossed, Gilt, Pope & Stevens' list.....40&10%

Leather, Pope & Stevens' list.....40%

Medford Fancy Goods Co.....40&10&50%

Combs Curry

American Curry Comb Co.....33&40%

Fitch's.....60&10&50&10&10%

Gibb's Magnetic.....\$1.00, 20%

Kohler's Humane.....\$1.75

Kohler's Magic Oscillating.....\$2.00

Rubber, per doz., \$10.00.....25%

Compasses, Dividers &c.

Compasses, Calipers, Dividers, 70&10@75%

Bemis & Call Co.'s

Dividers.....65%

Calipers, Call's Patent Inside.....65%

Calipers, Double.....65%

Calipers, Inside or Outside.....65%

Calipers, Wing.....60%

Compasses.....50&25%

Excelsior.....50%

Starrett's.....50%

Combination Dividers.....25%

Lock Calipers and Dividers.....25%

Spring Calipers and Dividers.....25&10%

Stevens & Co.'s.....25&10%

Coolers, Water

B. S. & Co., 2-gal., \$2.00; 3-gal., \$2.50;

4-gal., \$2.75; 5-gal., \$3.00 each.....33&14%

Coopers Tools—

See Tools, Coopers.

Cord—Sash—

Braided, Crown Drab and Fancy, \$1.50,

\$1.55.

Braided, Crown White, \$1.50, 50%.

Cable Laid Italian Sash.....\$1.90, 20%

Common.....\$1.85, 20%

Common Rusta Sash.....\$1.20, 13%

Egyptian, India Hemp, Braided.....\$1.20,

India Cable Laid Sash.....\$1.10, 12%

Massachusetts, White.....25%

Ossawa Mills—

Braided, Giant, Drab and Fancy, \$1.35,

\$1.35.

Braided, Giant, White, \$1.30, 10%

Patent, good quality.....\$1.10, 10%

Patent Russia Sash.....\$1.13, 14%

Samson—

Braided, Drab Cotton.....\$1.42, 40%

Braided, Italian Hemp.....\$1.40,

Braided, Linen.....\$1.56, 40%

Braided, White Cotton.....\$1.57,

Semper Idem, Braided, White.....20%

Silver Lake—

A quality, Drab, 55%.....25%

A quality, White, 50%.....25%

B quality, Drab, 35%.....10%

B quality, White, 30%.....10%

Sylvan Spring, Extra Braided, Drab, 39%

Sylvan Spring, Extra Braided, White, 34%

Tate's Solid Cord.....20%

Economy, Drab.....\$1.27,

Economy, White.....\$1.22,

Hercules, Drab.....\$1.30,

Hercules, White.....\$1.25,

White Cotton Braided, fair.....\$1.23, 24%

Wire Picture—

Braided or Twisted.....80&25@80&15%

Corkscrews—See Screws, Cork.

Corn Knives and Cutters

—See Knives, Corn.

Crackers, Nut—

Acme.....50%

Japanned, \$1.30.....50%

Nickel Plated, \$1.30.....10%

Blake's Patent, \$2.00.....10%

Table (H. & B. Mfg. Co.).....40%

Turner & Seymour Mfg. Co.....50%

Cradles—

Grain.....50&2@50&5&2%

Crayons—

White Crayons, \$1.00.....7&8%

D. M. Steward Mfg. Co.

Metal Workers, \$2.50.....25%

Railroad, \$2.00.....25%

Rolling Mill, \$2.50.....25%

Soapstone Pencils, \$1.50.....25%

See also Chalk.

Creamery Pails—See Pails, Creamery.

Crow Bars—See Bars, Crow.

Curry Combs—

See Combs, Curry.

Curtain Pins—

See Pins, Curtain.

Cutters—

Meat—

American.....30%

No. 1.....\$5 \$7 \$10 \$25 \$50 \$80

Enterprise.....25%

No. 10.....10 12 22 42

Each.....\$3 \$2.50 \$4 \$8 \$15

Dixon's, \$1.00.....40&10&25%

No. 1.....1 2 3

Draw Cut, each.....\$14.00 \$17.00 \$19.00 \$30.00

No. 5.....2 6 8

\$50 \$75 \$80 \$225.....20&25%

Hale's, \$1.00.....70%

No. 1.....11 12 13

Home No. 1, \$1.00.....55&10%

Little Giant, \$1.00.....40&10&50%

No. 305.....310 312 320 322

\$35.00 \$48.00 \$44.00 \$72.00 \$88.00

Miles' Challenge, \$1.00.....45&15&10%

No. 1.....2 3 4

Triumph No. 505, \$1.00.....21.00 25&30%

Woodruff's, \$1.00.....40&10&5%

No. 1.....100 150

Chadborn's Smoked Beef Cutter, \$1.00,

\$15.00 \$18.00

Enterprise Beef Shavers.....\$66.00

20%

Slaw and Kraut—

Tucker & Dorsey Mfg. Co.....40%

Kraut Cutters.....40%

Slaw Cutters, 1 Knife, \$1.00.....\$21.00

Slaw Cutters, 2 Knife, \$1.00.....\$30.00

Tobacco

Acme.....\$1.00, 40%

All Iron.....\$1.00, 40%

Champion.....\$1.00, 40%

Vasquez Lock Co.'s, \$1.00.....\$18.00 50&55%

National.....\$1.00, 30%

Sargent's.....\$1.00, 55&10%

Wilson's.....\$1.00, 55%

Washer—

Appleton's.....\$1.00, 80&10%

Bonney's.....\$1.00, 80&10%

Cincinnati.....\$1.00, 80&10%

Johns.....\$1.00, 80&10%

Penny's, \$1.00, Pol. \$1.40, Jap. \$1.65,

Smith's Pat. \$1.00, 20&10&10%

Diggers, Post Hole, &c.—

Cronk's Post Bars, \$1.00.....\$80.00

60&50&10%

Eureka Diggers.....\$1.00, 60&10%

Fletcher Post Hole Augers.....\$1.00, 60&10%

Gem, Improved, \$1.00.....\$9.00 20&10%

Gibbs' Columbia.....\$1.00, 12.00

Gibbs' Hustler.....\$1.00, 12.00

Gibbs' Imperial.....\$1.00, 12.00

Gibbs' National.....\$1.00, 12.00

Gibbs' Post Hole Digger.....\$1.00, 12.00

Kohler's Hercules.....\$1.00, 12.00

Kohler's Invincible.....\$1.00, 12.00

Kohler's Little Giant.....\$1.00, 12.00

Kohler's New Champion.....\$1.00, 12.00

Samson, \$1.00.....25&25&10%

Schneider.....\$1.00, 12.00

Shimer's Hollow Handle.....\$1.00, 50%

Vaughan's Post Hole Auger, \$1.00,

\$8.50@9.50

Dividers—See Compasses.

Dog Collars—See Collars, Dog.

Door Checks—

Halters—
 Covert's Adj. Rope Halters.....40¢
 Covert's Adj. Web Halters.....35¢
 Covert's Hemp Horse and Cattle Tie.....50¢
 Covert's Jute Cattle Ties.....70¢
 Covert's Jute Horse Ties.....70¢
 Covert's Rope, 7-16 in., Jute.....70¢
 Covert's Rope, 1/4 in., Hemp.....50¢
 Covert's Rope, Jute.....50¢
 Covert's Saddlery Works Halters.....35¢
 Covert's Saddlery Works Handy V. Halters.....35¢
 Covert's Saddlery Works Horse and Cattle Ties.....35¢

Hammers—
Handled Hammers—
 Atha Tool Co.....50¢
 Buffalo Hammer Co.....50¢
 Humason & Beckley.....50¢
 Verree.....50¢
 Cheney's Claw.....40¢
 Cheney's Machinist's & Riveting.....40¢
 C. Hammond & Son.....40¢
 Magnetic Tack, No. 1, 2, 3, \$1.25, 1.50 & 1.75.....30¢
 Maydole's, list Dec. 1, '85.....25¢
 Nelson Tool Works.....40¢
 Peck, Stow & Wilcox.....30¢
 Fayette R. Plumb.....40¢
 Artisan's Choice, A. E. Nail.....40¢
 Horseshoe Turning Hammers.....50¢
 Regular Y. & P. A. E. Nail.....50¢
 Other Hammers.....50¢
 Sargent's.....40¢
 Warner & Nobles, new list.....25¢

Heavy Hammers and Sledges—
 3 lb and under.....75¢
 5 to 10 lb.....80¢
 Over 10 lb.....80¢
 Wilkinson's Smiths.....10¢

Handcuffs and Leg Irons—
 See Police Goods.

Handles—
Cross-Cut Saw Handles—
 Atkins', new list.....40¢
 Champion.....15¢
 Ely's Perfection.....30¢
 Sensible.....40¢

Iron, Wrought or Cast—
 Barn Door, W. doz \$1.40.....10¢
 Bronze Iron Drop Latches.....70¢
 Chest and Lifting.....70¢
 Door or Thumb.....10¢
 Nos. 0 1 2 3 4.....10¢
 Per doz.....\$0.90 1.00 1.08 1.35 1.50
 Jap'd Store Door Handles—Nuts, \$1.62;
 Plate, \$1.10; no plate, \$0.88; doz 70¢ net
 Roggin's Latches.....70¢

Wood—
 Anger, assorted.....50¢
 Anger, large.....50¢
 File, assorted.....50¢
 Brad Axl.....50¢
 Apple Firmer Chisel, ass'd.....50¢
 Hickory Firmer Chisel, ass'd.....50¢
 Hickory Firmer Chisel, large.....50¢
 Socket Firmer Chisel, ass'd.....50¢
 Socket Framing Chisel, ass'd.....50¢
 Chisel, Fibre Head.....30¢
 Hammer, hatchet, Axe, &c.....40¢
 Hoe, Rake, Shovel, &c.....40¢
 Pat. Auger, Douglas.....50¢
 Pat. Auger, Ives.....50¢
 Pat. Auger, Swan's.....50¢
 Saw and Plane.....40¢
 J. B. Smith & Co.'s Pat. File.....50¢

Hangers—
 Barn Door, New England.....70¢
 Barn Door, old patterns.....70¢
 Barry.....50¢
 Best Anti-Friction.....50¢
 Boss.....50¢
 Carrier Steel Anti-Friction.....50¢
 Champion.....50¢
 Chicago Anti-Friction.....50¢
 Climax Anti-Friction.....50¢
 Cincinnati Nos. 1, 2, 25; 3, 25; 4, 25.....50¢

Orleans Steel.....50¢
Paragon No. 5, 6, 7 and 8.....50¢
Pendulum, Payson's.....50¢
Perfection.....50¢
Richards.....50¢
Samson Steel Anti-Friction.....50¢
Star.....50¢
Stearns' Anti-Friction.....50¢
Stearns' Challenge.....50¢
Stirling.....50¢
Terry's Ideal.....50¢
Terry's Modern.....50¢
Terry's Shield.....50¢
Terry's Solid.....50¢
Terry's Wrought Single Strap.....50¢
Victor, No. 1, \$1.50; No. 2, \$1.60; No. 3, \$1.80.....50¢
Warner's Pat.....50¢
Wild West.....50¢
Zenith for Wood Track.....50¢

Harness Snaps—See Snaps.

Hatchets—
 American Axe and Tool Co.....40¢
 Hunt's.....40¢
 Hurd's.....40¢
 Mann's.....40¢
 Underhill's.....40¢
 C. Hammond & Son.....10¢
 Fayette R. Plumb.....10¢
 Collins.....10¢
 Buffalo Hammer Co.....10¢
 Kelly's.....50¢
 P. S. & W. Co.....50¢
 Sargent's & Co.....10¢
 Schulte, Lohoff & Co.....10¢
 Ten Eyck Edge Tool Co.....10¢

Hay and Straw Knives
 See Knives.

Hinges—

Blind Hinges—
 Clark's Nos. 1, 3, 5, 1888, Old Pattern.....75¢
 Nos. 1 and 3, Tip Pattern.....75¢
 No 50, Buffalo Noiseless, 40, 60 and 65.....75¢
 Buffalo Reversible, Nos. 3, 2, 1, 0, 1 and 0.....75¢
 No. 1, Cottage, for wood only.....80¢
 No. 1, Diamond, for wood only.....80¢
 Dixie L. & P., Nos. 3, 2, 1, 1, 0, 0, 4 and 5.....75¢
 No. 25, Empire Reversible.....75¢
 Lull & Porter, Nos. 3, 2, 1, 0, 0, 4 and 5.....75¢
 Mortise Gravity, Nos. 2, 4, 4, 6, 8, 9 and 10.....50¢
 Huffer.....50¢
 Parker.....75¢
 North's Automatic Blind Fixtures, No. 2, for Wood, \$9.00; No. 3, for Brick, \$11.50.....10¢
 Reading's Gravity.....75¢
 Sargent's Nos. 3, 5, 11, 12, 13.....75¢

Gate Hinges—
 Automatic.....50¢
 Clark's Nos. 1, 2, 3.....50¢
 N. E.....50¢
 N. E. Reversible.....50¢
 N. Y. State.....50¢
 Western.....50¢

Spring Hinges—
 Acme.....30¢
 American Gate and Spring.....20¢
 Bardsley's Patent Checking.....15¢
 Barker's Double Acting.....25¢
 Bommer's Japanned.....35¢
 Bommer's All other Kinds.....30¢
 Buckman's.....15¢
 Chicago.....30¢
 Devore, No. 1.....\$13.00
 Empire and Crown.....20¢
 Freeport.....\$12.00
 Geer's Spring and Blank Butts.....40¢
 Hero and Monarch.....55¢
 Ideal No. 3.....\$10.00
 J. G. C. Covered, gro.....\$30.00
 New Idea Nos. 1 and 10, gross \$13.00
 New Idea Dbl. Acting.....45¢
 No. 10 Matchless.....60¢
 No. 25 Unbreakable.....80¢
 Cord.....20¢
 Reliable.....20¢
 Rex.....\$13.00
 Royal.....60¢
 Samson.....60¢
 Stearns' Noiseless Floor Hinge, set \$6.00.....20¢
 Union Mfg. Co.....25¢
 Union Spring Hinge Co.'s list.....20¢
 March, 1888.....20¢
 U. S.....25¢
 Wiles', No. 1, gro., \$16; No. 2.....\$13

Wrought Iron Hinges—
 List February 14, 1891.
 Corrugated Strap and T.....60¢
 Strap and T.....60¢
 Plate Hinges, 8, 10 & 12 in., D.....5¢
 "Providence" over 12 in., D.....4¢
 Rolled Blind Hinges, Nos. 32 and 34.....50¢
 Rolled Blind Hinges, Nos. 232 and 234.....50¢
 Rolled Plate.....50¢
 Rolled Raised.....70¢
 Screw Hook and Eye.....50¢
 Screw Hook and (6 to 12 in., D.....4¢
 Strap.....15¢
 (22 to 36 in., D.....3¢

Hoes—
 Eye-covil and Oval Pattern.....60¢
 D. & H. Scovill.....20¢
 Grub.....80¢
 Lane's Crescent, Planters' Pattern.....45¢
 Lane's Razor Blade, Scovill Pat.....30¢

Handled—
 Garden, Mortar, &c.....70¢
 Magic.....50¢
 Planter's Cotton, &c.....70¢
 Warren Hoe.....60¢

Hog Rings and Ringers—
 See Rings and Ringers.

Holisting Apparatus—
 See Machines, Holisting.

Hollow-Ware—
 See Ware, Hollow.

Holders—
 Bag—
 Sprengle's Pat.....50¢

Bit—
 Angular.....\$24.00
 Diagonal.....\$24.00
 Extension.....\$24.00
 Barber's.....\$15.00
 Ives.....\$20.00

File and Tool—
 Bals Pat.....\$4.00
 Nicholson File Holders.....20¢

Sash—
 Motley's Adj. Sash, Medium Size.....\$1.20

Hooks—
 Bird Cage, Reading.....60¢
 Bird Cage, Sargent's List.....60¢
 Clothes Line, Sargent's List.....55¢
 Clothes Line, Moore's.....70¢
 Clothes Line, Reading list.....60¢
 Coat and Hat, Moore's.....70¢
 Coat and Hat, Reading.....50¢
 Coat and Hat, Sargent's list.....55¢
 Hammock, E. C. Stearns & Co., doz.....60¢
 Harness, Reading list.....55¢

Wire—
 Atlas, Coat and Hat.....25¢
 Belt.....80¢
 Handy Hat and Coat.....50¢
 Indestructible Coat and Hat.....45¢
 Steady Ceiling Hooks.....50¢
 Williamson's Bird Cage Hooks, List April, 1892.....40¢
 Wire Coat and Hat, Gem, list April, 1888.....60¢
 Wire Coat and Hat, Miles, list April, 1888.....50¢
 Wire Coat and Hat, Standard.....60¢
 Bright Wire Goods—See Wire.

Wrought Iron—
 Cotton.....\$1.25
 Cotton Pat. (N. Y. Mallet and Handle Wks.....30¢
 Tassel and Picture, T. & S. Mfg. Co.....50¢
 Wrought Staples Hooks, &c.....See Wrought Goods

Miscellaneous—
 Bush.....55¢
 Fish Hooks, American.....50¢
 No. 2, 20; No. 3, \$2.10; No. 4, \$2.25
 Hooks and Eyes—Brass.....80¢
 Hooks and Eyes—Malleable Iron.....70¢
 Nollin's Grass.....\$2.25
 Winifree—Patent.....55¢
 Bench Hooks—See Bench Stops.

Horse Nails—See Nails, Horse

Horse Shoes—
 See Shoes, Horse.

Hose, Rubber—
 Competition, Fair quality.....75¢
 Competition, Low Grade.....60¢
 Extra.....60¢
 N. Y. B. & P. Co., Dundee.....60¢
 N. Y. B. & P. Co., Extra.....60¢
 N. Y. B. & P. Co., Para.....25¢
 Standard.....70¢
 Cotton Garden, 1 in., coupled:
 Fair Quality.....7¢
 Good Quality.....8¢

Huskers—
 Blair's Adjustable.....\$8.00
 Blair's Adjustable Clipper.....\$7.00
 Hubbard's Solid Steel.....\$7.50

Indurated Fiber Ware—
 See Ware, Indurated Fiber.

Irons, Curling—
 Nicol's Patent Curling Iron Heater, \$ doz.....\$1.00
 Silver Tipped Grace Darling Curling Iron, \$ doz.....\$1.75
 No. 65.....1.50
 No. 66.....1.50
 No. 67, Mustache.....1.25

Sad—
 From 4 to 10, at factory.....\$100
 B. B. Sad Irons, \$ doz.....\$2.40
 Chinese Laundry (N.E. Butt Co.), 8, 15, 15, Crown Improved.....60¢
 Ideal Irons, new list.....50¢
 Mahony's Troy Pol. Irons.....25¢
 Mrs. Potts' Sad Irons, per set:
 Small lots.....90¢
 National Self-Heating.....30¢
 New England.....50¢
 Salamander Irons.....25¢
 Self-Heating.....50¢
 Self-Heating Tailors'.....\$18.00
 Sensible Jan. 91.....50¢
 Sensible Tailors' Irons.....35¢

Soldering—
 Soldering Coppers.....\$19.21
 Covert's Adjustable, list Jan. 1, 1886.....35¢
 Tinker's Dread.....\$1.75; \$7.00
 Pinking Irons, \$ doz.....55¢

Jack Screws—See Screws.

Jacks, Wagon—
 Daisy.....83¢
 Lockport.....40¢
 Victor.....83¢

Kettles—
 Brass, Spun, Plain, list Jan. 1, '91, 25¢
 Brass, Spun, Plid. W.M. list Jan. 1, '91, 20¢
 Stamped Brass Kettles.....40¢
 Enameled and Tea—See Ware, Hollow.

Keys—
 Lock, Ass'n list Dec. 30, 1886.....65¢
 Eagle, Cobble, &c.....35¢
 Fitchkiss' Brass Blanks.....40¢
 Hotchkiss' Copper and Tinned.....40¢
 Hotchkiss' Pad. and Cab.....35¢
 Wollensak Tinned.....60¢

Knife Sharpeners—
 See Sharpeners, Knife.

Knives—
 Butcher, Shoe, &c.....25¢
 Ames' Bread Knives, \$ doz \$1.50, 15¢
 Ames' Butcher Knives.....25¢
 Ames' Shoe Knives.....25¢
 Foster Bros', Butcher, &c.....40¢
 Jordan's AA 1 Butchers', list.....20¢
 Moran's Shoe and Bread.....20¢
 Nichols' Butcher Knives.....40¢
 Wilson's Butcher Knives, list Dec 8, 1890.....25¢
 W. W. Wilson, Butcher, 6 in., \$2.00; 7 in., \$2.70; 8 in., \$3.80.....7¢
 Hay and Straw—See Hay Knives.
 Table and Pocket—Net Prices.

Corn—
 Bradley's.....10¢
 Wadsworth's.....25¢

Drawing—
 M. S. & W.....7¢
 Adjustable Handle.....25¢
 Bradley's.....25¢
 Douglass.....75¢
 Merrill.....60¢
 Watrous.....15¢
 L. & J. White.....20¢
 Wilkinson's Folding.....25¢

Hay and Straw
 Blizzard.....\$5.50
 Carter's Needle, \$ doz.....\$8.50
 Lightning, from jobbers.....\$6.50
 Nollin's Hay.....\$7.00
 Wadsworth's.....\$7.00

Mincing—
 Am. (2d quality), \$ gr., 1 blade, \$7;
 blades, \$12; 3 blades, \$18.....net
 Buffalo Adjustable.....\$3.00
 Knapp & Cowles.....\$3.00
 Lathrop's.....\$2.00
 Smith's, \$ doz., Single, \$2; Double \$3.....45¢

Knobs—
 Bardsley's Wood Door, Shutter, &c.....15¢
 Base, Rubber Tip.....70¢
 Carriage, Jap.....\$80.00
 Door, Mineral.....60¢
 Door, For Jap'd.....70¢
 Door, For Nickel.....\$2.00
 Drawer, Porcelain.....\$2.00
 Hemlock Door Knobs.....40¢
 Picture, Hemlock.....35¢
 Picture, Judd's.....60¢
 Picture, Sargent's.....60¢
 Shutter, Porcelain.....\$5.00
 Yale & Towne Wood, list Dec., 1885.....40¢

Ladders.
 Davies Extension and Single.....20¢

Ladles—
 Melting, P. S. & W.....35¢
 Melting, Reading.....35¢
 Melting, Sargent's.....60¢
 Melting, Warner's.....80¢

Lanterns—
Tubular—
 Anti-Friction, with Guard.....\$4.50
 Brass Plated, Sq. Lift, Guard.....\$5.50
 Cop. Plated, Sq. Lift, Guard.....\$5.50
 O. K. with Guard.....70¢
 Regular, with Guard.....\$3.50
 Side Lift, with Guard.....\$4.00
 Square Lift, with Guard.....\$4.25

Bull's Eye Police—
 2 1/2-inch flash light.....\$4.00
 3-inch flash light.....\$4.50
 2 1/2-inch regular.....\$3.50
 3-inch regular.....\$3.90

Lawn Mowers—
 See Mowers, Lawn.

Leaders, Cattle—
 Hotchkiss.....30¢
 Humason, Beckley & Co.'s.....70¢
 Peck, Stow & W. Co.....60¢
 Sargent's.....70¢

Lemon Squeezers—
 See Squeezers, Lemon.

Lifters, Transom—
 Beardsley & Mouat, Sure Grip.....50¢
 Excelsior.....50¢
 Payson's.....50¢
 Imperial.....60¢
 Solid Grip.....60¢
 Universal.....60¢

Reith's, list Feb. 20, 1891
 Brass, Real Bronze or Nickel Plate.....30¢
 Bronzed Iron Rods.....60¢
 Shaw's.....50¢
 Wollensak's:
 Class 3 and 4, Brass.....50¢
 Class 3 and 4, Bronzed Iron.....60¢
 Class 3 and 4, Bronze Metal.....50¢
 Skylight Lifters.....25¢

Lines—
 Chalk.....60¢
 Cotton and Linen Flea.....50¢
 Cotton Chalk.....50¢
 Mason's Colored Cotton.....45¢
 Mason's Linen, 8 1/4 ft., No. 1, \$1.25; No. 2, \$1.75; No. 3, \$2.25; No. 4, \$2.75; No. 5, \$3.25.....25¢
 Mason's Linen, No. 3 1/2, \$1.50; No. 4, \$2.00; No. 4 1/2, \$2.50.....25¢
 Ossawan Mills:
 Braided Chalk.....50¢
 Cotton Clothes Lines.....\$1.10
 Solid Braided Ventilator and Mason's Lines.....25¢
 Twisted Chalk.....60¢
 Samson Cotton, No. 4, \$2; No. 4 1/2, \$2.50.....60¢

Silver Lake, Braided No. 0, \$6.00; No. 1, \$6.50; No. 2, \$7.00; No. 3, \$7.50.....10¢
 Ventilator Cord, Samson Braided, White or Drab Cotton.....\$7.50
 Wire Clothes, Nos. 15 19 20 100 ft.....\$3.50 \$3.00 \$2.50

Links, Open—
 Terry's—per gro.:
 Nos. 1 2 3 4
 \$6.00 8.00 12.00 16.00

Locks, &c.—
Cabinet—
 Cabinet Locks.....50¢
 Barnes Mfg. Co.....40¢
 Delta, Nos. 30 to 34.....40¢
 Delta, Nos. 51 to 63.....40¢
 Delta, Nos. 87 to 98.....30¢
 Champion Night Latches.....25¢
 Eagle and Corbin Trunk.....35¢
 Champion Cab. and Combin.....35¢
 Romer's.....25¢
 Yale.....net prices

Door, Locks, Latches, &c.—
 Barnes Mfg. Co.....40¢
 Britain, Graham & Mathes, list Jan. 1890.....60¢
 Brooklyn Latches.....50¢
 Deltz flat Key.....30¢
 Mallory, Wheeler & Co. list July 188.....60¢

Pullers Nail-

Colpase..... doz., \$24.00, 40%
 Economy..... doz., \$20.00, 40%
 Giant, No. 1..... doz., \$18.00, 10%
 Giant, No. 2..... doz., \$15.00, 10%
 Pelican..... doz., \$10.00, 25%
 Scorpion..... doz., \$18.00, 35%

Pulleys-

Brass Screw..... 70%
 Hay Fork, "Anti-Friction," 5 in. solid, \$6.70..... 50%
 Hay Fork, "P" Common and Patent Bushed..... 20%
 Hay Fork, Moore's Anti-Friction 5 in. Wheel, \$12.00..... 40%
 Hay Fork, Reed's Self-Lubricating..... 60%
 Hay Fork, Solid Eye, \$4.00; Swivel, \$4.50..... 50%
 Hay Fork, Stearns' Nos. 35 & 45, 50 & 10%
 Hay Fork, Stearns' Nos. 15, 25, 50, 60, 80%
 Hay House, A. W. & Co., \$10.00..... 20%
 Japanned Clothes Line..... 60%
 Japanned Sewing..... 70%
 Japanned Side..... 70%
 Moore's Ceiling or End, Anti-Friction..... 40%
 Moore's Dumb Waiter, Anti-Friction..... 50%
 Moore's Electric Light..... 35%
 Moore's Side, Anti-Friction..... 50%
 Bash (Auger Mortise)..... 60%
 Common Sense..... 60%
 Empire..... 60%
 Ideal, Nos. 2, 4, 10 & 15..... 60%
 Ideal, Nos. 25 & 50..... 60%
 On bbl. lots extra 5%..... 45%
 Shade Rack..... 45%
 Shepard's Niagara, No. 25, \$20.25 net
 Tackle Blocks-See Blocks.

Pumps-

Cistern, Best Makers..... 60%
 Pitcher Spout, Best Makers..... 60%
 Pitcher Spout, Cheaper G'ds..... 70%
 Myers' Pumps, low list..... 60%

Punches-

Avery's Revolving..... 40%
 Avery's Sawset and Punch-See Sawsets
 Bemis & Call Co.'s Cast Steel Drive..... 50%
 Bemis & Call Co.'s Check..... 55%
 Bemis & Call Co.'s Spring..... 60%
 Bemis & Call Co.'s Springfield Socket..... 60%
 Niagara Hollow Punches..... 50%
 Niagara Solid Punches..... 55%
 Rice Hand Punches..... 15%
 Saddle's or Drive, good..... 20%
 Spring, good quality..... 20%
 Spring, Leach's Pat., S. & W. Co., \$1.45..... 15%
 Solid "Tinner's," P., S. & W. Co., \$1.45..... 15%
 Tinner's Hollow Punches, P., S. & W. Co..... 20%

Rail-

Barn Door, Light, In. 1/2, 3/4, 1, 10%
 Per 100 feet..... \$2.00 2.50 3.10, 10%
 B.D. for N. E. Hangers..... 10%
 Per 100 feet..... \$3.15 2.70 3.25 Net
 Carrier, double braced, Steel Rail, 1/2 foot..... 35%
 Lundy Parlor Door, Planed Edge, 1/2 ft. 7/8..... 45%
 Moody Steel Rail, 1/2 ft. 5/8..... 45%
 Moore's Steel Rail, Iron, 1/2 ft. 7/8..... 45%
 Sliding Door, Bronze, Iron, 1/2 ft. 7/8..... 45%
 Sliding Door, Iron, Painted, 1/2 ft. 7/8..... 45%
 Sliding Door, Wrt Brass..... 45%
 Terry's Steel Rail, 1/2 ft. 7/8..... 45%
 Victor Track Rail, 1/2 ft. 7/8..... 45%

Rakes-

Cast Steel, Association of G'ds..... 70%
 Cast Steel, outside G'ds..... 70%
 Malleable..... 70%
 Fort Madison Prize Bow Brace and Peppercorn..... 70%
 Fort Madison Steel Tooth Lawn Rake, \$6.00..... 25%
 The Gibbs'..... 25%
 Gibbs' Acme Lawn Rake..... 25%
 Gibbs' Canton Lawn Rake..... 25%
 Gibbs' Crown Lawn Rake, No. 1..... 25%
 Gibbs' Favorite Lawn Rake..... 25%
 Gibbs' Hustler No. 0..... 25%
 Gibbs' Hustler No. 1..... 25%
 Oneda Lawn Rake..... 25%

Razors-

Campbell Cutlery Co..... 50%
 Electric Cutlery Co..... Net prices
 Galvanic..... Net prices
 Jordan's A. & S. new list..... Net prices
 Jordan's Old Razorful, new list..... Net prices
 J. R. Torrey Razor Co..... Net prices
 Wostenholm and Butcher, \$10 to 2..... 10%

Razor Straps-

See Straps, Razor.

Reels, Clothes Line-

Stearns'..... 35%
 Moore's Bronze Finishes..... 70%
 Moore's Electroplated..... 75%
 Moore's Japanned..... 75%
 Moore's Solid Bronze..... 65%
 Moore's Stove Pipe..... 35%

Rings and Ringers-

Bull Rings-
 Ellrich Hdw. Co., White Metal, low list..... 50%
 Hotchkiss' low list..... 50%
 Humason, Beckley & Co., \$10.00..... 30%
 Peck, Stow & W. Co., \$10.00..... 30%
 Sargent's..... 75%
 Union Nut Co..... 65%
Hog Rings and Ringers-
 Blair's Hog Rings..... \$2.00
 Blair's Hog Rings..... \$2.00
 Brown's Rings..... \$2.00
 Brown's Rings..... \$2.00
 Champion Rings..... \$2.00
 Champion Rings, Double..... \$2.25
 Electric Hog Rings..... \$2.00
 Electric Hog Rings..... \$2.00
 Hill's Improved Rings..... \$1.50
 Hill's Old Style Rings..... \$1.25
 Hill's Rings..... \$1.00
 Hill's Tongs..... \$2.00
 Major Rings..... \$2.00
 Major Rings..... \$2.00
 Perfect Rings..... \$2.00
 Perfect Rings..... \$2.00
 Top of the Hill Rings..... \$2.00
 Top of the Hill Rings..... \$2.00

Rivets and Burrs-

Copper..... 60%
 Coppered Iron, Retina Brand..... 50%
 Iron Norway, list Nov. 17, '87..... 60%
 Second quality..... 70%

Rivet Sets-See Sets.**Roasting and Baking Pans-See Pans, Roasting and Baking.****Rods-**

Stair, Black Walnut..... \$20.00
 Stair, Brass..... 25%

Rollers-

Acme Moore's Anti-Friction..... 55%
 Barn Door, Sargent's list..... 60%
 Moore's Barn Door Stay..... 50%
 Union Barn Door Roller..... 70%
 Thompson Mfg. Co.'s Lawn Rollers..... 30%

Rope-The following prices are f.o.b., New York or factory, and are shaded 1/4% on large lots; terms, 1 1/2% for cash.

Manilla, 7-16 in. diam. and larger..... 7%
 Manilla, 7-16 in. diam. and larger..... 7%
 Manilla, Tarrad Rope..... 8%
 Manilla, Hay Rope..... 7%
 Sial, 7-16 in. and larger..... 5%
 Sial, 1/2 in. and 5-16 in..... 7%
 Sial, Hay Rope..... 5%
 Sial, Tarrad Rope..... 5%
 Sial, Medium Lath Yarn..... 5%
 Sial, 7-16 in. and larger..... 5%
 New Zealand..... 5%
 New Zealand, 1/2 in. and 5-16 in..... 5%
 New Zealand, Hay Rope..... 5%
 New Zealand, Tarrad Rope..... 5%
 Cotton Rope..... 15%
 Jute Rope..... 5%

Wire-

List February, 1892. All kinds..... 45%

Rules-

Boxwood..... 80%
 Ivory..... 50%
 Starrett's Steel Rules and Straight Edges..... 25%

Sad Irons-See Irons, Sad.**Sand and Emery Paper and Cloth-See Paper and Cloth.****Sash Cord-See Cord, Sash.****Sash Locks-See Locks, Sash.****Sash Weights-**

See Weights, Sash.

Sausage Stuffers or Fillers-See Stuffers or Fillers, Sausage.**Saws-**

Note-Extra 5% on 10% often given.

Atkins' Circular..... 50%
 Atkins' Cross Cut, new list..... 40%
 Atkins' Mulay, Mill and Drag..... 50%
 Atkins' One-Man Saw..... 40%
 Atkins' Wood Saws..... 40%
 Diston's Circular..... 45%
 Diston's Cross Cut, list Jan. 1, '93..... 45%
 Diston's Hand..... 25%
 C. E. Jennings & Co.'s..... 25%
 Peace Circular and Mill..... 45%
 Peace Cross Cuts, list Jan. 1, '93..... 45%
 Peace Hand, Panel and Rip..... 25%
 Richardson's Circular and Mill..... 45%
 Richardson's X Cuts, list Jan. 1, '93..... 45%
 Richardson's Hand..... 25%
 Simonds' Circular Saws..... 45%
 Simonds' Crescent Ground Cross Cut Saws..... 30%
 Simonds' Gang, Mill, Mulay and Drag Saws..... 45%
 Wheeler, Maden & Clemson Mfg. Co. Cross Cuts, list Jan. 1, 1893..... 45%
 Hand, Panel and Rip..... 30%
 Woodrough & McParlin..... 45%
 Cross Cuts, list Jan. 1, 1893..... 45%
 Hand, Panel and Rip..... 25%

Hack Saws-

Eureka and Crescent..... 25%
 Griffin's, complete..... 40%
 Griffin's Hack Saw Blades..... 40%
 Star Hack Saws and Blades..... 25%

Scroll-

Barnes' Builders' and Cab Makers' \$15.25..... 25%
 Barnes' Scroll Saw Blades..... 25%
 Lester, complete, \$10.00..... 25%
 Rogers, complete, \$4.00..... 25%

Saw Frames-

See Frames, Saw.

Saw Sets-See Sets, Saw.**Saw Tools-See Tools, Saw.****Scales-**

Chatillon's Eureka..... 25%
 Chatillon's Favorite..... 40%
 Chatillon's Grocers' Trip Scales..... 50%
 Family Turnbills..... 30%
 Hatch, Counter, No. 171, good quality..... \$18.00
 Hatch, Tea, No. 161..... \$20.00
 Riche Bros.' Platform..... 40%
 Union Platform, Plain..... \$22.00
 Union Platform, Striped..... \$24.00

Scale Beams-

See Beams, Scale.

Scissors, Fluting..... 45%**Scrapers-**

Adjustable Box Scraper (S. R. & L. Co.)..... 40%
 Box, 1 Handle..... \$2.00
 Box, 2 Handle..... \$3.00
 Defiance Box and Ship..... 20%
 Foot..... 50%
 Ship, Common..... \$3.50
 Ship, R. I. Tool Co..... 10%

Screen Window and Door

Frames-See Frames

Screw Drivers-

See Drivers, Screw

Screws-**Bench and Hand-**

Bench, Iron..... 55%
 Bench, Wood, Beech..... \$2.25
 Bench, Wood, Hickory..... 20%
 Hand, Wood..... 25%
 Hand, Grand Rapids, list..... 35%

Coach, Lag and Hand-Rail-

Lag, Blunt Point, list Jan. 1, 1890..... 80%
 Coach and Lag, Gimlet Point, list Jan. 1, 1890..... 80%
 Hand Rail, Am. Screw Co..... 75%
 Hand Rail, H. & B. Mfg. Co..... 70%
 Hand Rail, Sargent's..... 70%

Jack Screws-

Jack Screws, Millers Falls list..... 50%
 Jack Screws, P. S. & W..... 35%
 Jack Screws, Sargent..... 30%
 Jack Screws, Stearns..... 40%

Cork-

Detroit Cork Screw Co..... 35%
 Humason & Beckley Mfg. Co..... 40%
 Williamson's..... 35%
 Williamson's Forged Worm, Applewood Handle, \$5.00; Rosewood, \$5.50..... 40%

Machine-

Flat Head Iron..... 65%
 Round Head Iron..... 60%

Wood-

List January 1, 1891.
 Flat Head Iron..... 70%
 Round Head Iron..... 65%
 Flat Head Brass..... 70%
 Round Head Brass..... 65%
 Round Head Bronze..... 65%
 Rogers' Drive Screws..... 82%

Scroll Saws-See Saws, Scroll.**Scythes-**

Grain..... 40%
 Grass..... 40%

Scythe Snaths-

See Snaths, Scythe.

Sets-**Awl and Tool-**

Aiken's Sets, A. W. & Tools, No. 20, \$2.00..... 60%
 Common Brad Sets, No. 42, \$10.50; No. 43, \$12.50..... 70%
 Fray's Adj. Tool Hds., Nos. 1, \$12; 2, \$15; 3, \$12; 4, \$9..... 45%
 Fray's Combination Haft, \$2.00..... 45%
 Millers Falls Adj. Tool Hds., No. 1, \$12; No. 4, \$12; No. 5, \$18..... 25%
 Stanley's Excelsior, No. 1, \$7.50; No. 2, \$4.00; No. 3, \$5.50..... 30%

Nail-

Round..... \$3.25
 Square..... \$4.00
 Buck Bros..... 27%
 Cannon's Diamond Point..... \$12.20%

Rivet-

Regular list..... 70%

Saw-

Atkin's Criterion..... \$2.00
 Atkin's Genuine..... \$13.00
 Atkin's Combination Haft..... \$2.00
 Atkin's Lever..... \$2.00
 Avery's Saw Set and Punch..... 50%
 Bemis & Call Co.'s Cross Cut..... 30%
 Bemis & Call Co.'s Plate..... 20%
 Bemis & Call Spring Hammer..... 30%
 Common Lever..... \$2.00
 Crescent (Keller), No. 1, \$15.00; No. 2, \$24.00..... 40%
 Diston's Star..... 25%
 Hammer, Bemis & Call Co.'s new Pat. 45%
 Hammer, Hotchkiss..... \$5.50
 Hart's Pat. Lever..... 20%
 Kohler's Giant Rotary..... \$2.00
 Kohler's Royal..... \$2.00
 Leach's, No. 0, \$5.00; No. 1, \$15.00; No. 2, \$20.00..... 40%
 Leopold..... 40%
 Lloyd's Acme..... \$2.00
 Morrill's No. 1, \$15.00..... 40%
 Nos. 3 and 4, Cross Cut, \$23.00..... 40%
 No. 10, \$15.00..... 40%
 No. 11, \$15.00..... 40%
 Nash's..... 20%
 Stillman's Genuine..... \$5.00
 Stillman's Pattern, Hand, \$2.00; Cross Cut, \$5.00..... 40%
 Taintor Positive..... \$2.00

Sharpeners, Knife-

Parkin..... \$2.00
 Applewood Handles..... \$2.00
 Rosewood or Cocobola..... \$2.00
 Tanite Mills..... \$1.40

Shaves, Spoke-

Wood..... 45%
 Bailey's (Stanley R. & L. Co.)..... 30%
 Cincinnati..... 25%
 Goodell's..... 25%
 Stearns..... 40%

Shears-

Acme Cast Shears..... 10%
 American (Cast) Iron..... 75%
 Barnard's Lamp Trimmers..... \$3.75
 Cast Steel Trimmers:
 First quality..... 80%
 Second quality..... 80%
 Net..... 80%
 Nickel Plated..... 65%
 Claus brand, Japanned..... 70%
 Claus brand, Nickel, same list..... 80%
 Clipper..... 10%
 Davenport Cutlery Co..... 60%
 Diamond Cast Shears..... 10%
 Galvanic 3/4 to 9 in., \$2.00; 1 inch Hatch Cutlery Co., Solid Steel Forged, 80%
 Heinisch's, list Dec. 1881..... 60%
 Heinisch's Tailor's Shears..... 60%
 Howe Bros. & Hulbert, Solid Forged..... 40%
 Seymour's, list Dec. 1881..... 60%
 Victor Cast Shears..... 75%

Tinner's Snips-

Cast Handles, Laid with Steel..... 40%
 Niagara Snips and Shears..... 20%
 Vrt. Handles, Steel Blades..... 20%

Pruning Shears and Hook

Diston's Combined "Pruning" Hook and Saw..... \$18.00
 Diston's Pruning Hook..... \$12.00
 Dunlap's Saw and Chisel..... \$8.50
 Henry's Pruning Shears..... \$4.25
 E. S. Lee & Co.'s Pruning Tools..... 50%
 Levin Pruner No. 1, \$15.00; No. 2, \$10.00
 Levin Pruner No. 2, \$21.00
 J. Mallinson & Co., No. 1, \$5.25; No. 2, \$7.25
 Pruning Shears, Henry's Pat..... \$3.50
 P. S. & W. Co..... 60%
 Wheeler, M. & C. Co., Combination..... \$12.00

Tinner's, &c.-

Shears and Snips (P. S. & W.)..... 20%
 Snips, J. Mallinson & Co..... 35%

Sheaves-**Sliding Door-**

Corbin's list..... 60%
 M. W. Co., list July 1888..... 50%
 Moore's Anti-Friction..... 60%
 Patent Roller..... 60%
 Patent Roller, Hatfield's..... 75%
 R. & E., list Dec. 18, 1885..... 55%
 Russell's Anti-Friction, list Dec. 18, 1885..... 60%

Sliding Shutter-

Reading list..... 60%
 R. & E., list Dec. 18, 1885..... 60%
 Sargent's list..... 70%

Shells-

Brass Shot Shells, Club, Rival, Climax..... 65%
 Brass Shot Shells, list quality..... 60%
 First quality 4, 8, 10 and 12 gauge..... 25%
 First quality Rival, Club and Climax brands, 14, 16 and 20 gauge (\$2.50 list)..... 20%
 Prize..... 40%
 Seibold's Comb. Shot Shells..... 15%
 Smokeless brand, 12, 10, 16 gauge..... 35%

Star, Club, Rival and Climax Brand..... 35%

Trap brand, 12 and 10 gauge..... 35%

Shells, Loaded-

Standard list, July 19, 1890..... 40%

7% cash, 10 days.

Ship Tools-

L. & J. White..... 20%

Shoes, Horse, Mule, &c.

Burden's, Perkins', Phoenix, Standard, Diamond State, Bryden's, Ross and Crescent..... \$3.50

Bryden's Frog Pressure, at factory \$5.00

Mule-

Add \$1 keg to above prices.

Ox Wrought-

1000 lb lots..... \$2.00

500 lb lots..... \$1.00

Shot-

Drop, up to B, 25-b bag..... \$1.15
 Drop, up to B, 5-b bag..... .35
 Drop, B and larger, 25-b bag..... 1.40
 Drop, B and larger, 5-b bag..... .40
 Buck and Chilled, 25-b bag..... 1.40
 Buck and Chilled, 5-b bag..... 2.00
 Dust Shot 25-b bag..... 2.00
 Dust Shot 5-b bag..... .45

Shovels and Spades

Ames' Shovels, Spades, &c., list Nov. 1, 1885 (Except Nos. named below)..... 20%
 The following Nos. are subject to discount of 27%: Nos. 445 to 572; 838 to 880; and Nos. 1004, 1009, 1014, 1019, 1024, 1027 and 1029..... 50%
 Griffith's Black Iron..... 60%
 Griffith's C. S..... 60%
 Griffith's Solid C. S. & R. Goods..... 20%
 Hubbard & Co., Antrim list..... 25%
 Hubbard & Co.'s Chisholm Pattern..... 50%
 Hussey, Blans & Co..... 15%
 H. M. Myers Co..... 30%
 Lehigh Mfg. Co..... 50%
 St. Louis Shovel Co..... 20%
 Payne Peterson & Co., \$2.00..... 45%
 Remington's (Lowman's Pat.)..... 40%
 Rowland's Black Iron..... 60%
 Rowland's Steel..... 60%
 Terra Haute Shovel & Tool Co..... 25%

Shovels and Tongs-

Brass Head..... 60%

Iron Head..... 60%

Sieves and Sifters-

A. V. Sifters..... \$7.15
 Buffalo Metallic, S. S. & Co..... 50%
 Electric Light..... \$2.00
 Hunter's Genuine..... \$1.75
 Hunter's Imitation..... \$1.50

Mann's Tin Rim..... \$7.15

Shaker (Barber's Pat.) Flour Sifters..... \$2.00

Sieves, Wooden Rim-

Mesh 18, Nested, \$2.00..... \$1.00
 Mesh 20, Nested, \$2.00..... .95
 Mesh 24, Nested, \$2.00..... 1.15

Sinks, Wrought Steel-

Columbus, Galvanized and Enameled..... 60%

Columbus, Painted or Unpainted..... 30%

New Era, Painted..... 40%

New Era Galvanized and Enameled..... 60%

Skins, Thimble-

Western list..... 75%
 Coldbrookdale Iron Co..... 60%
 Columbus Vrt. Steel, Special net prices..... 75%
 Seneca Falls Pattern..... 60%
 Utica P. S. T. Skins..... 35%

Slates-

Snaps, Harness, &c.

Anchor 1. & S. Arg. Co. 60¢
 Andrews 50¢
 Cover's Saddlery Works' Triumph 33¢
 Covered Spring 60¢
 Covert 60¢
 Covert, New Pat. 60¢
 Cover, New R. E. 60¢
 Fitch's (Bristol) 60¢
 German, new list 40¢
 Hotchkiss 10¢
 Kelley & Woolworth's Steel Harness 50¢

John Prots Snaps 50¢
 Sargent's Patent Guarded 70¢

Snaths—

Scythe 50¢
 Soldering Irons—

See *Crane, Soldering*

Splittoons, Cuspidors, &c.

Standard Fiberglass—

Cuspidors, 3/4-inch, 5 doz., No. 5, 18; No. 6, 40

Splittoons, Daisy, 8-inch, No. 1, 10 and 11 inch, 40

Spoke Shaves—

See *Snaps, Spoke*

Spoke Trimmers—

See *Trimmers, Spoke*

Spoons and Forks—

Tinned Iron—

Basting, Cen. Stamp. Co.'s list 70¢
 Buffalo, S. S. & Co 33¢
 Solid Table and Tea, Cen. Stamp. Co.'s list 70¢

Silver Plated—

4 months or 50 days 50¢

Boardman & Son 50¢
 Holmes & Edwards Silver Co. 40¢
 Meriden Brit. Co., Rogers 40¢
 Reed & Barton 40¢
 Rogers & Bros 40¢
 C. Rogers & Hamilton 40¢
 Wm. Rogers Mfg. Co. 40¢
 Simpson, Hall, Miller & Co. 40¢

Miscellaneous—

Boardman's Britannia Spoons, case 40¢
 Boardman's Nickel Silver, list July 1 1891 60¢
 Britannia 60¢
 German Silver 60¢
 Nickel Silver 60¢
 Holmes & Edwards Silver Co. 60¢
 No. 24 German Silver 60¢
 No. 30 Silver Metal 60¢
 No. 49 Nickel Silver 60¢
 No. 50 Nickel Silver 60¢
 No. 67 Mexican Silver 60¢
 Rogers & Hamilton 60¢
 Clmetar, Flatware 40¢
 Clmetar, Steel Goods 40¢
 Crown Hamilton, Flatware and Cutlery 30¢
 Steel Goods 40¢
 Wm. Rogers Mfg. Co. 40¢
 18¢ Rogers' German Silver 60¢
 25¢ Rogers' Nickel Silver 60¢
 Rogers' Silver Metal 60¢

Springs—

Door—

Champion (Coll) 60¢
 Corwell's, No. 1, 5 doz 18.00; No. 2, 15.00
 Gem (Coll), list April 19, 1886 20¢
 Hercules 60¢
 P. H. H. 30¢
 Rubber complete 40¢
 Star (Coll), list April 19, 1886 20¢
 Torrey's Rod, 3/8 in 40¢
 Warner's No. 1, 5 doz 15.00; No. 2, 3.40
 Victor (Coll) 60¢

Carriage, Wagon, &c.

Elphie Concord, Platform and Half Scroll 60¢
 Elphie's Roller Springs 25¢

Sprinklers, Lawn—

Gibbs' Arc 50¢
 Gibbs' Hustler 50¢

Squares—

Nickel-Plated 30¢
 Steel and Iron 30¢
 Try Square and T Bevels 60¢
 Avery's Bevel Protractor 50¢
 Avery's Flush Bevel Squares 40¢
 Diston's Try Square and T Bevels 50¢
 Starrett's Micrometer Caliper Squares 25¢

Winterbottom's Try and Miter 30¢

Squeezers

Fodder—

Blair's 50¢
 Blair's "Climax" 50¢

Lemon—

Porcelain Lined, No. 1 60¢
 Wood, Common 60¢
 Wood, No. 2 60¢
 Dean's, No. 1, 5 doz 3.50; No. 2, 1.90
 Dunlap's Improved 50¢
 Hotchkiss Straight Flash 50¢
 Jennings' Star 50¢
 King 50¢
 Little Giant 50¢
 Sammis 50¢
 18¢ doz 50¢
 Silver & Co., Glass 50¢
 The Boss 50¢

Standard Fiber Ware—

See *Ware, Standard Fiber*

Staples—

Barbed Blind, 4 in. and larger 70¢
 Barbed Blind, 4 in. 70¢
 Fence Staples, Galvanized 70¢
 Fence Staples, Plain 70¢
 Grand Crossing Tack Co.'s list 75¢

Steels Butchers—

C. & A. Hoffmann's 40¢
 Nichols Bros 40¢
 Steel 40¢

Steelyards

Blacksmith's 35¢
 Butterfield's Goods 35¢
 Waterford Goods 35¢
 Gardner 35¢
 Green River 35¢
 Lightning Screw Plate 35¢
 Reece's New Screw Plates 35¢
 Reversible Ratchet 30¢

Stops, Bench—

Cincinnati 25¢
 Hotchkiss 25¢
 McGuffey 25¢
 Millers Falls 25¢

Morrill's, 5 doz, No. 1, 10.00; No. 2, 11.00

Stearns' 20¢
 Terrell's Nos. 1 and 2, 5 doz, 35; No. 3, 35.00

Washita Stone, No. 1, 10.00; No. 2, 9.25; 10.50

Stone—

Stones, Grind—See *Grindstones*

Scythe Stones—

Pike Mfg. Co., list April, 1892 33¢
 Cleveland Stone Co., list Nov. 1892 33¢

Oil Stones, &c.—

Pike Mfg. Co. 80¢
 Hindostan No. 1, 5 doz 40¢
 Sand Stone 40¢
 Turkey Oil Stone, 4 to 8 40¢
 in 100 10¢
 Turkey Slips 20¢

Lily White Washita 60¢
 Rosy Red Washita 60¢
 Washita Stone, Extra 60¢
 Washita Stone, No. 1 60¢
 Washita Stone, No. 2 60¢
 Lily White Slips 60¢
 Rosy Red Slips 60¢
 Washita Slips, Extra 60¢
 Washita Slips, No. 1 60¢
 Arkansas Stone, No. 1, 5 to 5 60¢
 in, 52.80
 Arkansas Stone, No. 1 5 1/2 to 8 in 60¢

Lake Superior 13¢
 Lake Superior Slips 20¢
 Tanite Mills 50¢
 Emery Oil 50¢

Stove Polish—

See *Polish, Stove*

Stretchers Carpet—

Cast Iron, Steel Points 75¢
 Cast Steel, Polished 22.25
 Socket 17.75
 Brad's 25¢

Strops Razor—

Badger Belt and Com 20¢
 Campbell Cutlery Co. Net prices
 Electric Utility Co. Net prices
 Genuine Emerson 60¢
 Imitation 20¢
 Jordan's Pat. Padded, list Nov. 1 60¢
 Lamont Combination 40¢
 Torrey's 40¢

Stuffer Sausage—

Miles' Challenge 50¢
 Perry 50¢
 21.00 50¢
 Draw Cut No. 4, each 30.00 20¢
 Enterprise Mfg. Co., list Jan 17, '93 25¢
 Silver's 40¢

Sweepers, Carpet and Lawn—

Carpet—

Aeme 20¢
 Advance 18.00
 Banner 24.00
 Jap'd, 5 doz, 22.00; Nickel, 24.00
 Bissell No. 6 17.00
 Bissell No. 8 20.00
 Bissell, Grand 36.00
 Crown Jewel, No. 1 18.00; No. 2, 19.00; No. 3, 20.00
 Domestic 21.00
 Domestic, No. 2 22.00
 Easy, Jap'd, 5 doz 22.00; Nickel, 24.00
 Excelsior 22.00
 Ring 18.00
 Gilt Edge 24.00
 Grand Rapids 24.00
 Grand Republic 24.00
 Jap'd, 5 doz 30.00; Nickel, 33.00
 Housewife's Delight 15.00
 Imperial 26.00
 Improved Parlor Queen 24.00
 Japanned 24.00
 Nickle 27.00
 Ladies' Friend 15.00
 Ladies' Friend No. 2 18.00
 Magic 15.00
 Model 27.00
 Parlor Queen 24.00
 Our Leader 19.00
 Our Own 27.00
 Rapid, Jap'd, 5 doz, 22.00; Nickel, 24.00
 Reliable 22.00
 Standard 24.00
 Supreme 24.00
 The Star 22.00
 Triumph 20.00
 Goshen Sweeper Company, Grand Rapids, Mich., make the following rebates 5 dozen in 6 months 10.00
 10 dozen in 6 months 20.00
 15 dozen in 6 months 30.00
 20 dozen in 6 months 40.00
 25 dozen in 6 months 50.00

Lawn—

Thompson Mfg. Co. 30¢

Swings—

Davies Lawn 25¢

Tacks Brads &c.—

October 19, 1889. Old established straight weights. Short weight goods are sold at lower prices.

Carpet Tacks—

American, Blued 80¢
 American, Tin'd and Cop'd 65¢
 Steel, Bright and Blued 80¢
 Steel, Tinned and Coppered 65¢
 Swedes Iron, S. S., Blued 85¢
 Swedes Iron, S. S., Tinned 70¢
 American Iron Tacks, Domestic 50¢
 American Iron Tacks, Foreign 50¢
 Swedes Iron Tacks—

S. S., Blued 55¢
 S. S., Tinned 50¢
 Lanc., Blued 50¢
 Lanc., Tinned 55¢
 Upholsterers' S. S. 60¢
 Upholsterers' Lanc. 50¢
 Gimp Tacks—

S. S., Blued 55¢
 S. S., Tinned 50¢
 Lanc., Blued 50¢
 Lanc., Tinned 55¢
 Basket and Trimmers' Tacks—

Lanc. 45¢
 S. S. 50¢
 Lanc. 50¢
 Common and Patent Brads 50¢
 Leathered Tacks 50¢
 Brush Tacks and Nails, S. S. 25¢
 Looking Glass Tacks, S. S. 15¢
 Picture-Frame Points, S. S. 25¢
 Lace Tacks, Blued 45¢
 Lace Tacks, Tinned 50¢
 Finishing Nails 50¢
 Trunk and Clout Nails—

Black 60¢
 Tinned or Coppered 65¢
 Basket Nails 50¢
 Chair Nails 50¢
 Cigar Box Nails 40¢
 Tin Capped Nails 50¢

Extra 30¢ & 2¢ cash.

Miscellaneous—

Double Point 90¢
 Wire Carpet Nails 60¢
 Bill Nye Brad Box 40¢
 Bill Nye Brad Box 40¢
 Claw Hand Carpet 40¢
 Home Tacks, No. 50 50¢
 Home Tacks, No. 100 50¢
 Home Tacks, No. 200 50¢
 Home Tacks, No. 400 50¢
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Whips

American Whip Co.: Length.	4 1/2	5	6	7	7 1/2	8 ft.
X. L. Whalebone Driving.....	\$18.00	\$20.00	\$22.00	\$24.00	\$27.00	\$30.00
Eureka, Two-thirds Whalebone.....	15.00	16.50	18.00	20.00		
Bull Bone, Half-length Whalebone.....						
American Standard.....	8.00	8.50	9.00	9.50	10.00	10.50
True Grip, Raw Hide Center.....	6.00	6.00	6.50	7.00	7.50	8.00
New Name, Stocked Java, Black.....						
and Wine Colors.....						
American, 93 Pen Whip.....						
Gents' Light Driving No. 111.....						
Gents' Light Driving No. 106.....						
Hand-made Stocked Java No. 103.....						
A large variety of cheaper grades.....						
Team Whips.....						
Foy Whips.....						
Hardware Assortment, 10/American, 75 Whips for \$50.00.						

Wire and Wire Goods—

Iron—

Market,

Br. & Ann., Nos. 0 to 18.....	75¢ to 10¢
Cop'd, Nos. 0 to 18.....	75¢ to 10¢
Galv., Nos. 0 to 18.....	75¢ to 10¢
Tin'd, Nos. 0 to 18.....	75¢ to 10¢

Stone, Br. and Ann'd.....	80%
Nos. 16 to 18.....	80%
Nos. 19 to 26.....	80%
Nos. 27 to 36.....	80%
Ann'd Wire on Spools.....	80%
Brass, 1st Jan. 18, 1884.....	80%
Copper, 1st Jan. 18, 1884.....	80%
Galvanized Fence.....	80%
Malin's An'ded & Tin'd on Spools.....	80%
Malin's Brass and Cop. on Spools.....	80%

Steel Music Wire, 12 to 30, imported.....
 Stub's Steel Wire.....
 Tate's Spooled, Tin'd & Annealed.....
 Tate's Spooled Cop. and Brass.....
 Tinned Broom Wire, 18 to 21, # 10.....
 Wire Clothes Line, see Lines.....
 Wire Picture Cord, see Cord.....

Bright Wire Goods—

Standard list.....
 Wire Cloth and Netting—
 Galvanized Wire Netting.....
 Painted Screen Cloth # 100 ft.....

Wire Barb—

See Trade Report.

Wire Rope—See Rope, Wire.

Wrenches—

American Adjustable.....	40%
Baxter's Adjustable "S".....	40%
Baxter's Diagonal.....	40%
Coe's Genuine.....	40%
Coe's "Mechanics".....	40%
Girard Standard.....	40%
Lamson & Sessions' Engineers'.....	40%
Lamson & Sessions' Standard.....	40%
Girard Agricultural.....	40%
Lamson & Sessions' Agric'l.....	40%
P. S. & W. Agricultural.....	40%
W. & B. Diamond.....	40%

Aome, Bright.....	50¢
Aome, Nickel (Bright).....	50¢
Alligator.....	50¢
Always Ready.....	50¢
Bemis & Call's.....	50¢
Briggs & Pattern.....	50¢
Cylinder or Gas Pipe.....	50¢
Derick's Pattern.....	50¢
No. 3 Pipe.....	50¢
Pat. Combination Black.....	50¢
Pat. Combination Bright.....	50¢
Boardman's.....	50¢
Cincinnati Brace Wrenches.....	50¢
Diamond Steel.....	50¢
Donohue's Engineer.....	50¢
Eagle.....	50¢
Hercules.....	50¢
Taft's Vise Wrench.....	50¢
The Favorite Pocket.....	50¢
Walker's.....	50¢
Webster's Pat. Combination.....	50¢

Wringers, Clothes—

Am. Wringer Co.'s list July 1, '93.....	2% cash
Colby Wringer Co.'s list Sept. 1, '91.....	2% cash
Lovell Mfg. Co.'s list July 1, 1892.....	2% cash
Peerless Mfg. Co.'s list July 1, 1892.....	2% cash
National Wringer & Mfg. Co., list June 1, 1892.....	2% cash

Wrought Goods—

Staples, Hooks, &c., list, March 17, 1893.....	85¢ to 10¢
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Paints, Oils and Colors.—Wholesale Prices.

Animal and Vegetable

Oils—

Linseed, City, raw.....	52	@	54
Linseed, City, boiled.....	55	@	57
Linseed, Western, raw.....	52	@	54
Lard, City, Extra Winter.....	65	@	66
Lard, City Prime.....	65	@	66
Lard, City, Extra No. 1.....	65	@	66
Lard, City, No. 1.....	65	@	66
Lard, Western, prime.....	65	@	66
Cotton-seed, Crude, prime.....	25	@	27
Cotton-seed, Crude, off grades.....	25	@	27
Cotton-seed, Summer Yellow, prime.....	31	@	33
Cotton-seed, Summer Yellow, off grades.....	31	@	33
Sperm, Crude.....	62	@	64
Sperm, Natural Spring.....	63	@	65
Sperm, Bleached Spring.....	68	@	70
Sperm, Natural Winter.....	68	@	70
Sperm, Bleached Winter.....	73	@	75
Whale, Crude.....	44	@	46
Whale, Natural Winter.....	44	@	46
Whale, Bleached Winter.....	47	@	49
Whale, Extra Bleached.....	42	@	44
Sea Elephant, Bleached.....	42	@	44
Menhaden, Crude, Sound.....	32	@	34
Menhaden, Crude, Southern.....	36	@	38
Menhaden, Light Pressed.....	36	@	38
Menhaden, Bleached Winter.....	41	@	43
Menhaden, Extra Bleached.....	44	@	46
Tallow, City, prime.....	50	@	52
Tallow, Western, prime.....	50	@	52
Cocunut, Ceylon.....	54	@	56
Cocunut, Cochiti.....	54	@	56
Cod, Domestic.....	38	@	40
Cod, Foreign.....	42	@	44
Red Saponified.....	35	@	37
Bank.....	38	@	40
Straits.....	39	@	41
Olive, Italian, bbls.....	58	@	60
Neatsfoot, prime.....	60	@	62
Palm, prime, Lagos.....	54	@	56

Mineral Oils—

Black, 20 gravity, 25 @ 30 cold test.....	7	@	7 1/2
Black, 20 gravity, 15 cold test.....	7 1/2	@	8
Black, 20 gravity, summer.....	6	@	6 1/2
Cylinder light, filtered.....	14	@	16

Cylinder, dark, filtered.....	10	@	12
Paraffine, 23 1/2 @ 24 gravity.....	11	@	12
Paraffine, 25 gravity.....	10	@	11
Paraffine, 28 gravity.....	7 1/2	@	8
Paraffine, red.....	9 1/2	@	10 1/2

Paints and Colors—

Barytes, Foreign, # ton.....	\$22.00
Barytes, Amer. floated.....	\$22.00
Barytes, Amer. No. 1.....	\$18.00
Barytes, Amer. No. 2.....	\$13.00
Barytes, Amer. No. 3.....	\$11.00
Blue, Celestial.....	6
Blue, Chinese.....	40
Blue, Prussian.....	25
Blue, Ultramarine.....	8
Brown, Spanish.....	3
Brown, Vandyke, Amer.....	3
Brown, Vandyke, English.....	6
Carmine, No. 40, in bulk.....	2.75
Carmine, No. 40, in boxes or barrels.....	2.85
Carmine, No. 40, in ounce bottles.....	3.75
Chalk, in bulk.....	1.75
Chalk, in bbls.....	33
China Clay, English.....	13.00
Cobalt Oxide, prep'd.....	9.00
Cobalt Oxide, black.....	1.90
Cobalt Oxide, black.....	1.96
Green, Paris, in bulk.....	10
Green, Paris, 170 @ 175 # kgs.....	10 1/2
Green, Paris, small pack.....	12
Green, Chrome, ordinary.....	6
Green, Chrome, pure.....	22
Lead, Eng., B.B. white.....	7
Lead, Amn. White, dry or in oil.....	6 1/2
Kegs, lots less than 500 b.....	5 1/2
Kegs, lots 500 b to 5 tons.....	5 1/2
Kegs, lots 5 tons to 12 tons.....	5 1/2
Kegs, lots 12 tons and over.....	5 1/2
Lead White, in oil, 25 # tin.....	1
Lead White, in oil, 12 1/2 # tin.....	1
Lead White, in oil, 1 to 5 # as sorted tins, add to keg price.....	5 1/2
Lead, Red, bbls. and 1/2 bbls.....	5 1/2
Lead, Red, kegs.....	5 1/2
Litharge, kegs.....	5 1/2
Litharge, bbls. and 1/2 bbls.....	5 1/2

TERMS, &c.—Lead and Litharge.—On lots of 500 b or over, 60 days' time or 2 1/2 % discount for cash if paid within 15 days of date of invoice.

Ocher, Rochelle.....	1.35
Ocher, French Washed.....	1 1/2
Ocher, German Washed.....	1 1/2
Ocher, American.....	1 1/2
Orange Mineral, French.....	10
Orange Mineral, German.....	8 1/2
Orange Mineral, American.....	8 1/2
Paris White, English Cliff.....	1.00
Paris White, American.....	65
Red, Indian, English.....	5 1/2
Red, Indian, American.....	2
Red, Turkey.....	9
Red, Tuscan.....	10
Red, Venetian, American.....	1.00
Red, Venetian, English.....	1.20
Sienna, Italian, Burnt and Powd. # 10.....	4
Sienna, Ital., Burnt Lumps.....	1 1/2
Sienna, Ital., Raw, Powd.....	4 1/2
Sienna, Ital., Raw, Lumps.....	1 1/2
Sienna, American, Raw.....	1 1/2
Sienna, American, Burnt and Powd.....	1 1/2
Talc, French.....	1 1/2
Talc, American.....	1 1/2
Terra Alba, Fr'ch, # 100 b.....	95
Terra Alba, English.....	70
Terra Alba, American No. 1.....	65
Terra Alba, American No. 2.....	45
Umber, Turkey, Burnt and Powd.....	3 1/2
Umber, Turkey Bnt. Lu.....	2 1/2
Umber, Turkey, Raw and Powd.....	3 1/2
Umber, Turkey, R'w Lumps.....	2 1/2
Umber, Turkey, R'w Amer.....	1 1/2
Umber, Turkey, R'w Amer.....	1 1/2
Yellow, Chrome.....	10
Vermilion, American Lead.....	11
Vermilion, Quicks'er, bulk.....	43
Vermilion, Quicks'er, bags.....	44
Vermilion, Quicksilver sm'r.....	52
Vermilion, English Import.....	80
Vermilion, Imitation, Eng.....	8
Vermilion, Trieste.....	90
Vermilion, Chinese.....	92 1/2
Whiting Common, # 100 b.....	37 1/2
Whiting Gliders.....	45

Zinc, American, dry.....	3 1/2
Zinc, French, Red Seal.....	7 1/2
Zinc, French, Green Seal.....	9
Zinc, French, V. M. X.....	7 1/2
Zinc, Antwerp, Red Seal.....	7 1/2
Zinc, German, L. Z. O.....	6 1/2
Zinc, V. M. in Poppy Oil, G. Seal, lots of 1 ton and over.....	10 1/2
Zinc, V. M. in Poppy Oil, Red Seal, lots less than one ton.....	11
Zinc, V. M. in Poppy Oil, Red Seal, lots of 1 ton and over.....	10 1/2
Discounts.—French Zinc.—Discounts to buyers of 10 bbl. lots of one or assorted grades, 1 1/2 % bbls. 2 % 50 bbls. 4 % No discount allowed or less than bbl. lots.	

Colors in Oil—

Black, Drop, Frankfort.....	25
Black, Drop, English.....	12
Black, Drop, Domestic.....	7
Black, Lampblack, Best.....	20
Black, Lampblack, Common.....	7
Black, Ivory.....	8
Blue, Chinese.....	35
Blue, Prussian.....	20
Blue, Ultramarine.....	12
Brown, Vandyke.....	7
Green, Chrome.....	8
Sienna, Raw.....	7
Sienna, Burnt.....	7
Umber, Raw.....	7
Umber, Burnt.....	7

Putty—

In barrels and 1/2 bbls.....	.01 1/2
In tubs.....	.01 1/2
In tin cans.....	.01 1/2
In bladders.....	.01 1/2

Spirits Turpentine—

In regular bbls.....	@ 30 1/2
In machine bbls.....	@ 31

Glue—

Low Grade.....	8
Cabinet.....	12
Medium White.....	13
Extra White.....	17
French.....	18
English.....	10
Irish.....	12

THE IRON AGE.

The oldest paper in the world devoted to the interests of the Hardware, Iron and Metal Trades, and a standard authority on all matters relating to those branches of industry.

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Per Annum, Postpaid.

Weekly Edition: \$5.00 = £1 = 25 francs = 20 marks = 11 florins = 6 roubles (coin) = 25 lire = 20 pesetas.	
Semi-Monthly Edition: \$2.50 = 10/ = 12 1/2 francs = 10 marks = 6 florins = 3 roubles (coin) = 12 1/2 lire = 10 pesetas.	
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